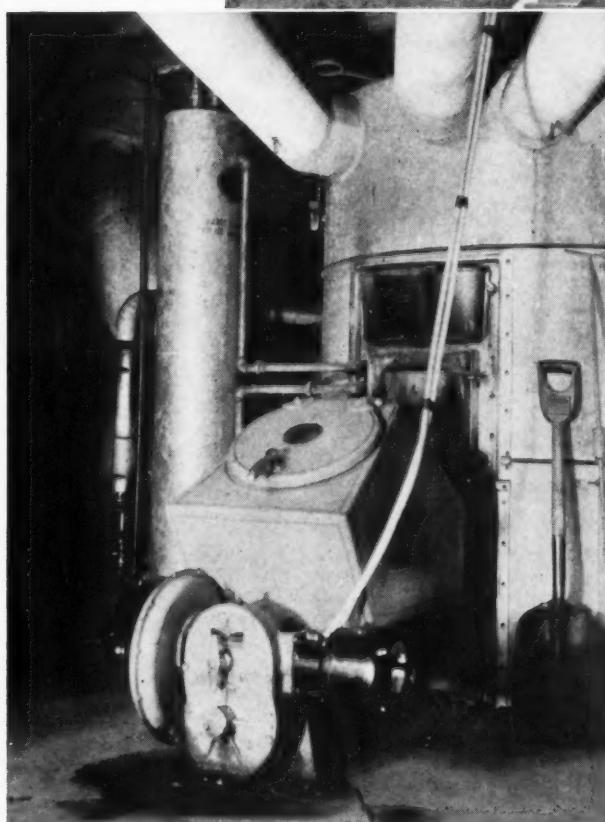


# American Artisan

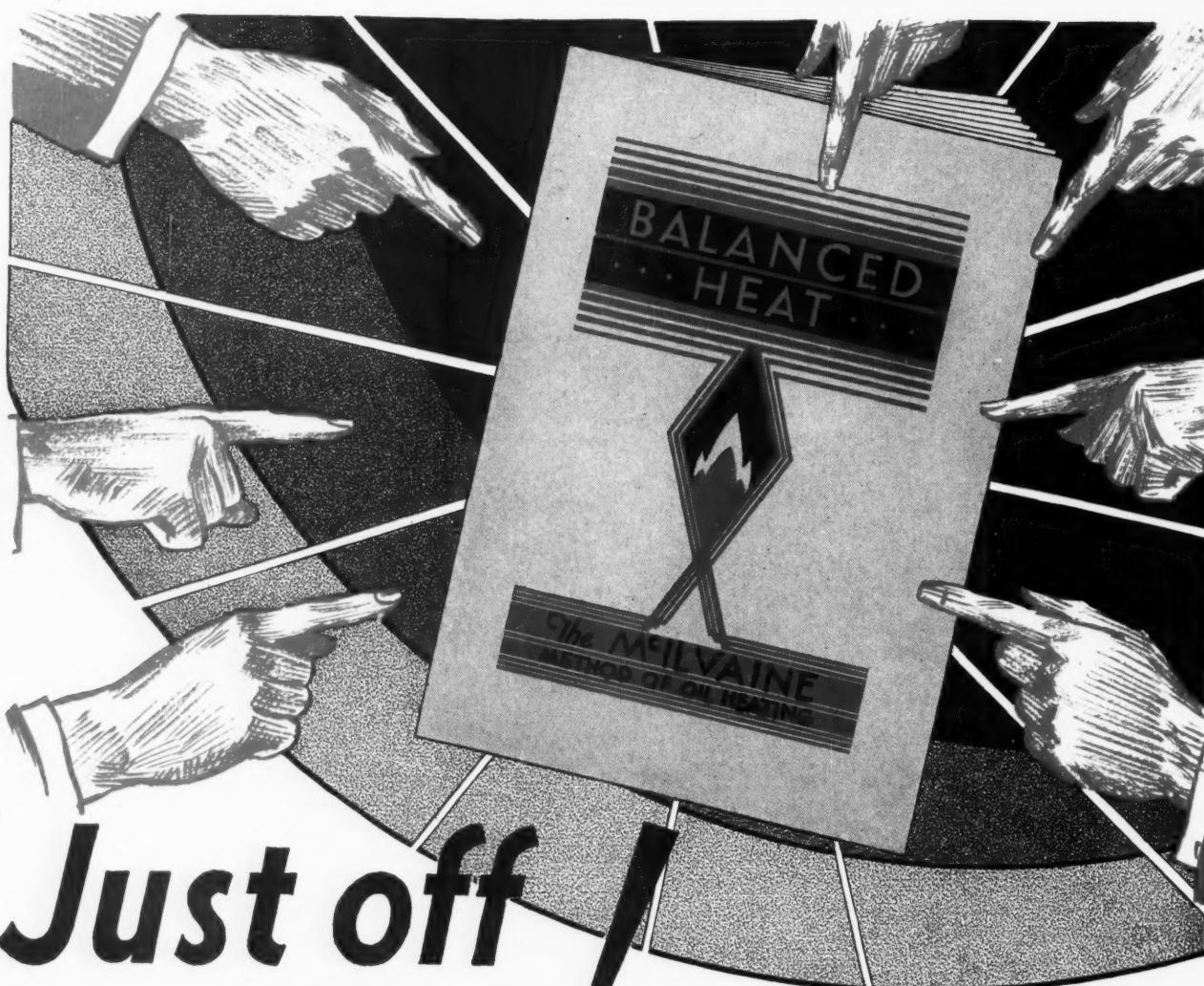
THE WARM AIR HEATING  
AND SHEET METAL JOURNAL

FOUNDED 1880



**S**TOKERS have long been used in industry to provide hard-fuel, automatic heat at low cost. Now the stoker is finding a waiting market among home owners. Its advantages are as pronounced in the home as in the factory. In this issue is a story about the selling and installing of stokers in houses.

AUGUST 16, 1930



# Just off The PRESS! Write Now—

For This Free Book  
Which Gives the Real Facts About Oil Burners!

This new book has created a sensation in the Oil Burner Industry. It contains 34 pages of facts that every oil burner dealer should know. Its publication marks a new era in the Oil Burner Industry. Facts cannot be denied! Laboratory tests cannot be "laughed off!" Actual Performance is convincing evidence that cannot be questioned! Balanced Heat is the only scientific method of heating with oil.

The McIlvaine Burner—fully protected by patents—operates on an entirely different principle from others, and is the only Oil Burner that exactly balances the heat loss caused by outside temperature conditions. It's the Ideal Method, and automatically maintains an indoor temperature that is always just right—comfortable and healthful. The McIlvaine excels in efficiency, economy and dependability.

Write for our Sales Plan and Liberal Proposition to Dealers

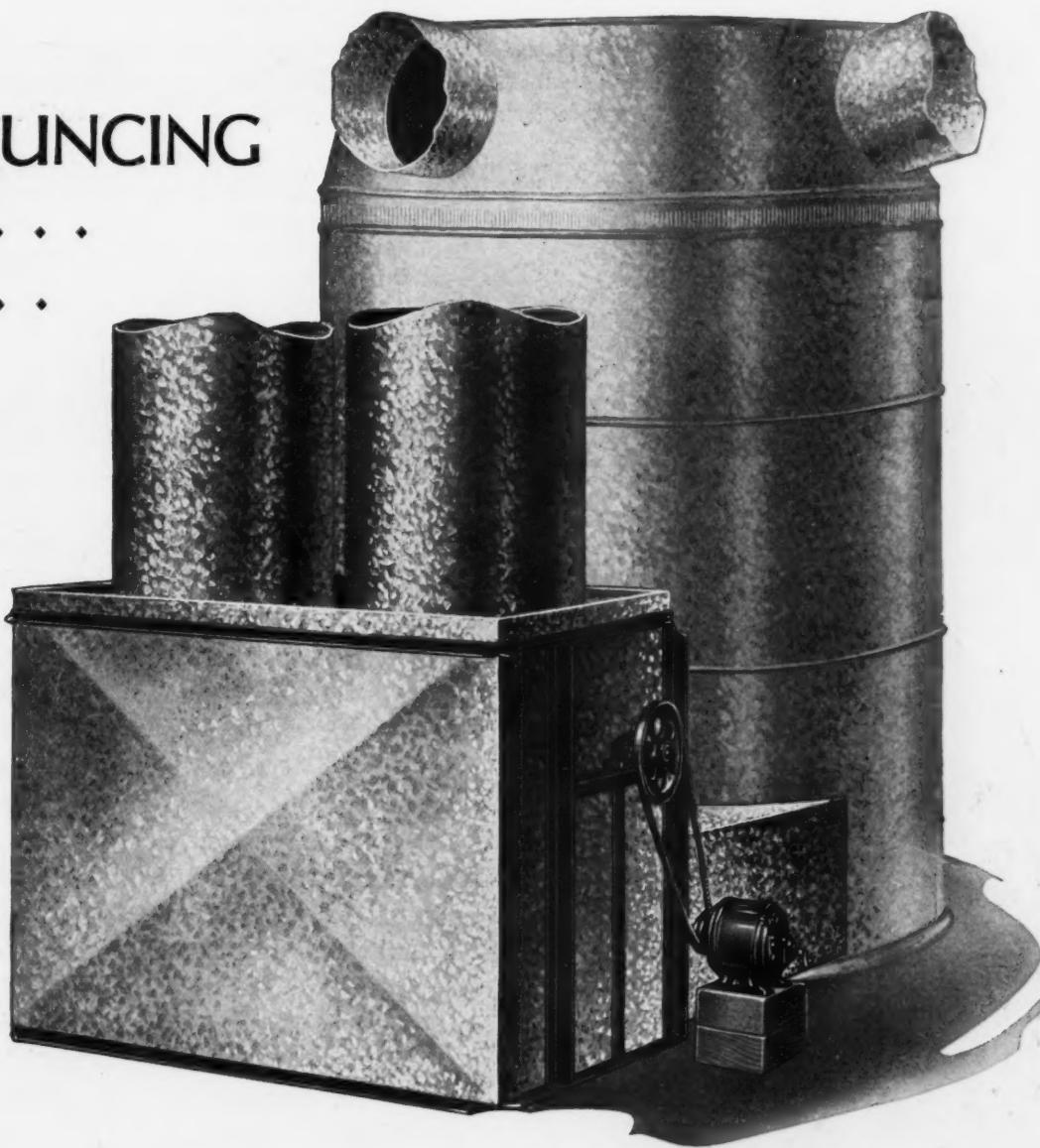
McILVAINE BURNER CORPORATION, 747 Custer Ave., Dept. A, Evanston, Ill.

**McILVAINE**  
OIL BURNER





ANNOUNCING  
THE . . .  
NEW . . .



# Brundage FORCED-AIR-PATENTED System

For increasing the efficiency of any make of Warm Air Heating Equipment

*Write for further information and interesting dealer proposition—*

SILENT ~ ECONOMICAL ~ COMPACT

MANUFACTURED BY

**THE BRUNDAGE COMPANY**  
KALAMAZOO, MICHIGAN

Published Every Other Week by Porter, Spofford, Langtry Corp., 139 North Clark Street, Chicago, Illinois. AMERICAN ARTISAN—the *Warm Air Heating and Sheet Metal Journal*—entered as second class matter, January 29, 1930, at the Post Office at Chicago, Illinois, under the act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record.

INDEX PAGES—16 and 58

[VOL. 99, NO. 17—\$2.00 PER YEAR]

BUYERS' DIRECTORY—54 and 56

### 5 WAYS TO MAKE MORE FURNACE PROFITS

- 1 Develop Prospects
- 2 Sell a Good Furnace
- 3 Surpass Competition

- 5 Keep Them Satisfied

### THE A.B.C.'S OF THE FURNACE BUSINESS

*The most successful NIAGARA Dealers have built their successes pretty definitely on the "5 Ways to Make More Furnace Profits." Some have stressed one point, some another. Our 39 years of manufacturing and selling furnaces has given us plenty of evidence that these A.B.C.'s are fundamental.*

## 4. Cut Installation Overhead



One-piece radiator, lighter than average, increasing radiation. Feed section unusual in design, giving maximum radiating area. Dust and gas leaks practically eliminated. Maximum life fire pots. Triangular bar grate requires no bolts, nuts, or cotter pins. Ash removal easy. One-piece base facilitates installation. Modern finish, oxidized copper flaked with gold.

THE profit of a good sale vanishes if the installation is slow and difficult and unnecessary trips have to be made to get the system working properly. This gamble is eliminated when you sell NIAGARA Furnaces. The NIAGARA'S simple method of assembly, illustrated at the bottom of the page, speeds up installation because everything fits—no costly delays. You can figure in advance just how much it will cost to install the NIAGARA. The new features of the NIAGARA place it in big demand—this, combined with its simple installation advantages, assures you a substantial profit. Write the factory for the NIAGARA proposition in detail.

# NIAGARA

Warm Air Heating Systems



FOREST CITY-WALWORTH RUN FOUNDRIES COMPANY  
CLEVELAND, OHIO

Mention AMERICAN ARTISAN in your reply—Thank you!



**The Store  
In Winona, Minn.**



**Wm. Galewski, Founder**

**H. W. Dunmore,  
V. P. & Treas.**

**W. A. Galewski,  
Pres. & Sec.**

**W. A. GALEWSKI, Pres. & Sec'y**



Established 1903

**H. W. DUNMORE, Vice Pres. & Treas.**

**Winona Heating & Ventilating Co.**  
INCORPORATED  
WARM AIR FURNACES  
FURNACE, PIPE AND FITTINGS, REGISTERS, ASBESTOS, PRODUCTS,  
GARANZIED IRON AND ALL KINDS OF ROOFING.  
ESTIMATES FURNISHED FREE  
WINONA MINN. July 11, 1930

NO. LAFAYETTE ST.  
1903 SECOND ST.

**The Meyer Furnace Company,  
Peoria, Illinois.**

Quotations subject to change without notice. All contracts and agreements are contingent upon strikes, accidents, delays or other occurrences beyond our control. Accepted orders and contracts cannot be canceled unless by mutual consent. Geographical and clerical errors subject to correction.

**Gentlemen:**

We are pleased to send you, with our compliments, a recent photograph of our establishment which we hope may be of some value to you.

An interesting fact in connection with our business is that it and the WEIR Furnace have grown together in Winona, for when Mr. Wm. Galewski, Sr., started in business in 1903 he introduced steel Warm Air Furnaces in Winona by handling the WEIR Furnace from the start and this has been continued without interruption all thru the past 28 years, and over fifteen hundred satisfied users prove the wisdom of his judgement.

We attribute our success in the heating business in a great measure to handling the highest class furnace on the market and maintaining the same high standard in our installations--never taking a chance on an undersized furnace.

We are proud of the fact that the second generation of our townsfolk is now buying WEIR Furnaces from the second generation of this Company, and we hope that our relations with the Meyer Furnace Company and their splendid co-operation may continue as in the past.

Yours truly,

WINONA HEATING & VENTILATING CO.

*H. W. Dunmore*

**They've Sold  
WEIRS  
for 28  
Consecutive  
Years**

**What More Is There  
to Say?**

**The Meyer Furnace Company**  
1300 S. Washington St., Peoria, Illinois

*Say you saw it in AMERICAN ARTISAN—Thank you!*

One-piece radiator — from smoke pipe to cleanout door. Cleanout sill even with bottom of radiator.



Pouches extend through casting — doors and frame are disc-ground. Bottom sill of combustion chamber is part of main section.

## Here is a Furnace Design That Speaks for Itself

### The NEW PEERLESS CAST FURNACE

NEAT, trim and attractive yet strong, massive and with quality showing in every part. Nothing was overlooked. The furnace that will give your customers the quality and heating satisfaction they want. Because its design shows improvements far ahead of others you will make easier and quicker sales and profits.

**Have You the RIGHT Furnace to Sell Your Prospects?**

Write today for full details on the Peerless Cast Furnace—Peerless Boiler Plate Furnace and the popular priced Pleasant Home Steel Furnace.

#### The Peerless Foundry Company

*Builders of the Peerless Boiler Plate Furnace*

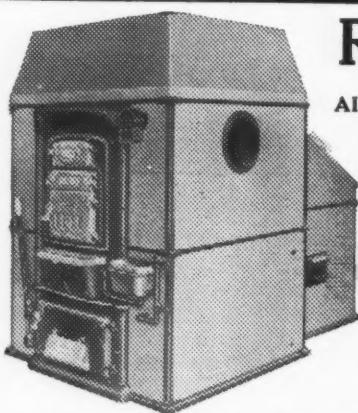
Indianapolis, Ind.

Warehouse,  
Youngstown,  
Ohio

### WATERBURY SEAMLESS FURNACE

REG. U. S. PAT. OFF. PIPE OR PIPELESS

The Waterman-Waterbury Co.  
1122 Jackson Street N. E.  
Minneapolis, Minn.



### RUDY Coal Fired AIR CONDITIONING SYSTEMS

HEATING for Winter — Cooling for Summer. Removal of dust and bacteria by efficient air filters — Controlled humidity — Air delivered under positive pressure — Complete thermostatic control. Baffled — Tested — Duco Finished.

RUDY FURNACE  
COMPANY  
Dowagiac Mich.

"Always Referred to Where Good Heaters Are Mentioned"

Warehouses in the  
leading cities

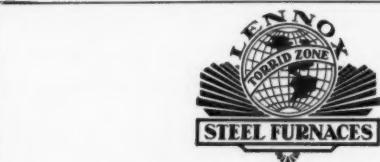
## MONCRIEF FURNACES

The  
Series  
"C"

Send for catalogs

THE HENRY FURNACE &  
FOUNDRY CO.

3471 E. 49th St. Cleveland, Ohio



#### An Emblem of Quality

The dealer who has never sold Torrid Zone steel furnaces has no conception of the many advantages this furnace line offers. To say you are familiar with Torrid Zone construction is not enough. There are, free engineering service, newspaper and dealer help advertising, financial aid, an unusual va-

riety of furnace sizes, quick deliveries made possible by large warehouse stocks, and a score of other Torrid Zone service features of vital interest to every furnace dealer. Why not investigate for yourself Torrid Zone possibilities. Write for complete information on the Torrid Zone line.

LENOX FURNACE COMPANY, INC.  
Marshalltown, Iowa Syracuse, N. Y. Toronto Winnipeg

# Make Silent Automatic a part of every Heating System you install . . .



FOR WARM AIR, STEAM AND  
HOT WATER HEATING SYS.  
TEMS—OLD OR NEW HOMES

EVERY home-owner for whom you have installed a heating system . . . every home-owner for whom you ever will install one . . . is a "hot prospect" for a "Silent". It's up to you to cash in on the remarkable record of "owner satisfaction" that has made Silent Automatic the *world's largest producer of domestic oil burners*. You can pocket TWO profits on every job!

Silent Automatic oil burners have been installed with complete satisfaction in thousands of every type of heating plant . . . hot water, steam, vapor or WARM AIR. In fact, 28% of all "Silent" installations are made in warm air heating systems, regardless of how small the furnace is.

## And POCKET TWO PROFITS!



Moreover, *there is never any noise*, for Silent Automatic is **REALLY silent**. It requires a minimum of service, lasts for many years and creates customers who *tell others* about their splendid heating systems.

Silent Automatic sales in 1929 were 65% greater than in 1928 . . . and on July 31 of this year *dealer sales alone* were 54% greater than during the first six months of 1929. Who is better fitted to share in these big profits than **YOU?** Mail the coupon **TODAY**.

**SILENT AUTOMATIC CORPORATION**  
12001 East Jefferson Ave. Detroit, Mich.

# SILENT AUTOMATIC

THE NOISELESS OIL BURNER

Made by the World's Largest Producer of Domestic Oil Burners

Say you saw it in AMERICAN ARTISAN—Thank you!

(338)

C O U P O N

**SILENT AUTOMATIC CORPORATION**

Please tell me how I can make the installation of Silent Automatics a profitable part of my business. Give me the details of your Dealer Plan.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

# Vernois

## Furnace of Time-Proven and Tested Merits

Note the large Fire and Ash Pit doors, the one-piece Radiator with both clean-out and smoke collars cast on.



*The Vernois Ball Bearing round grate is very easy to operate. The center dump makes removal of clinkers easy. The upright shaking lever eliminates stooping.*

All the above features make it easier for you to sell the Vernois. Ask for particulars. No obligation.



Vernois Cabinet Circulator



Vernois Gas Range

Vernois Cabinet Circulators are handsome pieces of furniture and produce a constant circulation of warm air, heating cold corners and frigid floors at small cost. They are wood grained without nickel to polish.

**MT. VERNON FURNACE &  
MFG. CO.**  
Mt. Vernon, Ill.

# REX

## Gas Furnaces

THE REX GAS FURNACE is a product of our 37 years of research and experience in the manufacture of Gas Fired Furnaces and Units.

This new improved REX for either forced air or gravity is a surface combustion, tubular furnace designed and constructed to burn gas economically and efficiently, the white arrows show the long detour in fire travel of the burned gas to the flue.

People are demanding greater comfort, more convenience, less drudgery and cleaner heat, REX GAS Furnace is the solution.

Now is the time to get lined up for fall business, write today for literature and prices.



Broken View of  
No. 290 Gas Furnace

### CALKINS & PEARCE

203-05 East Long Street, Columbus, Ohio

Manufacturers of Rex Gas Furnaces, Gas Attachments, Gas Furnace Units, Factory and Garage Heaters

Your prospects will  
prefer the—

# GILTEDGE FURNACE

and you will prefer the profits and  
prestige the agency bring you

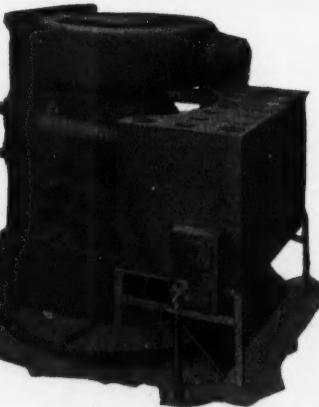
**R. J. SCHWAB & SONS CO.**  
283 Clinton Street Milwaukee, Wis.

*You can sell  
GAS HEATING  
to OLD as well  
as new customers  
with*

### The MUNKEL GAS ATTACHMENT

It fits any coal furnace—  
It heats both units giving  
extra large radiating surface.  
Simple, efficient, economical  
and easy to install.  
Stimulate business and  
make more profits with the  
Munkel Gas Attachment.  
*Write today for full details*

**The MUNKEL-RIPPEL  
HEATING CO.**  
"31 Years of Service"  
Columbus, Ohio



# ANNOUNCING A MUELLER GAS-ERA FURNACE

## *Pressed of Steel*

Combining Price Appeal with Mueller standards of High Quality, Dependability and Efficiency . . . . .

A gas-fired warm air furnace by Mueller, embodying the same advanced principles of corrugated ribbed heating surface as the Mueller Gas-Era cast furnaces. Hot gases pass over these ribbed sections at high velocity, securing maximum operating efficiency.

Constructed of heavy-gauge, pressed, copper-bearing sheets, machine welded . . . casing attractively finished in green lacquer. Designed to sell at a price without sacrificing quality or efficiency.

Standardization of parts and packing greatly simplifies stocking, pricing and installation. Whenever a stock is carried, no extra parts are required. It is only necessary to ship a complete individual package for each increasing section, regardless of size of furnace. Only one stock of parts necessary for furnaces of any capacity.

*Investigate this revolutionary gas-fired furnace. Mail the coupon for details.*

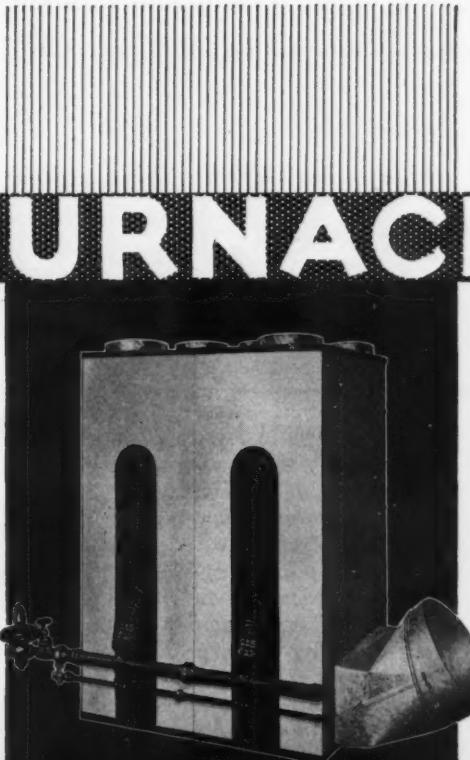
L. J. MUELLER FURNACE CO., 193 Reed St., Milwaukee, Wis.

Makers of the complete line of Gas-Era Gas-Fired Furnaces and Boilers.

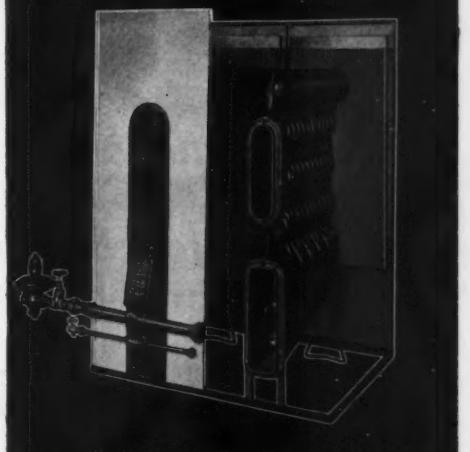


Approved in all sizes by American Gas Association, Inc., Testing Laboratories . . . capacities in multiples of 45,000 to 450,000 B. T. U's.

# MUELLER



Multiple unit construction, permits use of the number of standard sections required to secure correct capacity for any installation. Note the trim, clean-cut lines. Stands only 53 inches high.



Illustrating Mueller ribbed, serpentine type heating sections, which assure maximum efficiency.

### THE COUPON IS FOR YOUR CONVENIENCE

L. J. MUELLER FURNACE CO.,  
193 Reed St., Milwaukee, Wis.

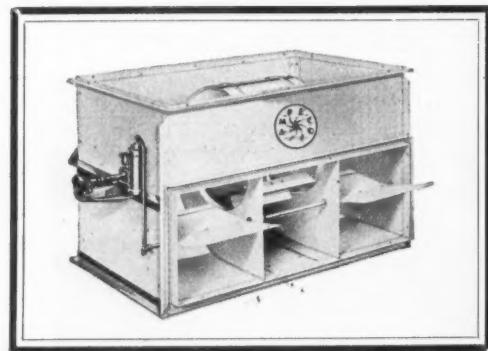
Catalog, prices, and full details, please, regarding the new Mueller Pressed Steel Gas-Era Furnace.

Firm Name.....

Address .....

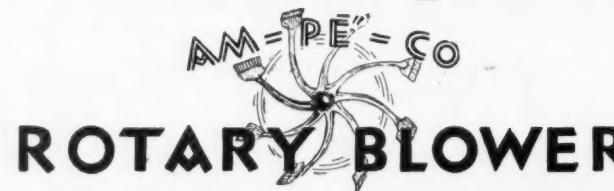
Name and title of individual making request

# Sell forced warm air heating for increased profits



**T**HE Am-Pe'-Co Rotary Blower is designed with Dampered Outlets. As soon as the blower stops the dampers open automatically. An oil pump and regulator of our own design insures positive operation.

Another exclusive Am-Pe'-Co feature is the air chamber back of blower housing which provides fully balanced air distribution to both inlets and unrestricted entry of free air from top, side and bottom of inlets.



## ROTARY BLOWER

**M**OST folks have never even heard of a *blower* to force warm air throughout the home. Showing the Am-Pe'-Co will create real interest on the part of present and prospective owners of warm air heating systems. One sale is *bound* to lead to many others.

*Make it a point now to feature forced air heating in your advertising.*

An Am-Pe'-Co Rotary Blower in your windows or a cut of it in your newspaper advertising with a few words telling that *it forces the warm air throughout the house* will attract attention, extra sales and extra profits. The Am-Pe'-Co is practical, efficient and reasonably priced. Outstanding dealers throughout the country are enthusiastic about it.

*Write for full details today*

**AMERICAN MACHINE PRODUCTS COMPANY**

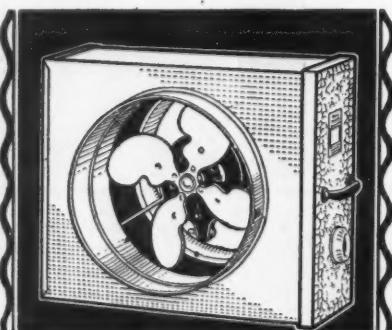
Marshalltown, Iowa

### A-C Thermostatically Controlled Automatic HEAT BOOSTER

**Powerful, Quiet, Efficient  
Simple and Trouble Free**

NO other similar fan gives the quality and features of the A-C at anywhere near the price of the A-C. The Mercury Control on the A-C makes it positively automatic—the easy practical installation cuts down labor costs and its freedom from noise and vibration make it the preferred fan with hundreds of live dealers. The A-C is made in several sizes—it can be installed in all types of jobs.

Order from your Jobber or write direct for full details.



No. 9 size Unit with 10 inch Outlets, designed for average small home—Mercury Control, Heat Booster, Fan and Unit—all ready to install complete including Automatic Control to the dealer—

**\$36.00**

**A-C MANUFACTURING COMPANY**  
417 Sherman Street  
Pontiac, Ill.

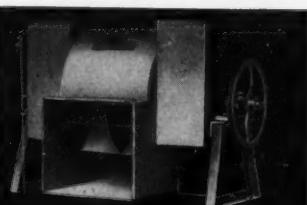
### Furblo The Furnace Blower Everyone Recommends

MANUFACTURERS have adopted FURBLO as standard equipment—jobbers catalog FURBLO exclusively—dealers everywhere find FURBLO the one and only satisfactory solution to the problem of mechanical warm air heating.

FURBLO is not a fan—but a blower. Quiet, efficient, powerful, sturdy, dependable. Guaranteed to always produce on even the hardest job.

**Lakeside Company**  
Dept. AA-8, Hermanville, Mich.

Two sizes fit practically all installations. Send for complete information.  
Makers of Lakeside Ventilating Equipment



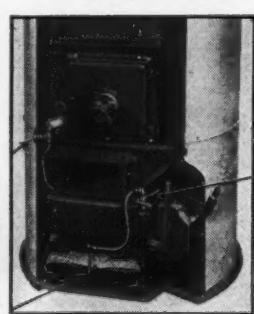
### Every Furnace User Wants One FURNACE DUST ELIMINATOR

MAKE a hit with your customers—include this patented feature on every new installation—costs little but makes the job of removing ashes a clean, easy task.

It prevents dust from spreading throughout the home—saves grates and fuel.

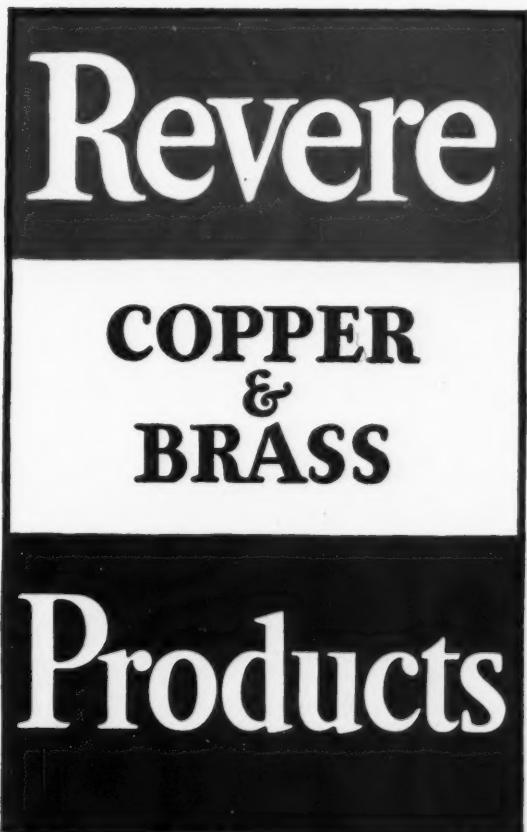
Fine nozzle spray settles the dust. A turn of the control valve before shaking or removing ashes does the trick. High quality throughout—easily attached.

Get full details and prices today—make extra profits this season.



**DUSTLESS ASH COMPANY**  
MUSKEGON, MICHIGAN

Mention AMERICAN ARTISAN in your reply—Thank you!



*All*

# Revere Products

marketed under this label

THE SEVEN PLANTS of Revere Copper and Brass Incorporated make a complete line of copper, brass and bronze products of finest quality.

All Revere products will be marketed under the Revere red, white and blue label.

This label stands for reliability, responsibility and service. The Revere organization is the oldest, their copper mills, located at important industrial centers, are the largest, and their equipment is the most modern in this country.

---

SEVEN  
REVERE PLANTS . . . . . *See next page* ➤

# These 7 plants

1. Baltimore, Md. . . . . Baltimore Copper Mills
2. Chicago, Ill. . . . . Dallas Brass & Copper Co.
3. Detroit, Mich. . . . . Higgins Brass & Manufacturing Co.
4. Detroit, Mich. . . . . Michigan Copper & Brass Co.
5. New Bedford, Mass. . . . . Taunton-New Bedford Copper Co.
6. Rome, N. Y. . . . . Rome Brass & Copper Co.
7. Taunton, Mass. . . . . Taunton-New Bedford Copper Co.

*manufacture*

# Revere

## COPPER and BRASS

## PRODUCTS

+

PAUL REVERE, in 1801, installed the first copper rolling mill in this country, which was operated by Paul Revere and Son. In 1828, Paul Revere and Son, combining with James Davis and Son, brass founders,

started a chain of consolidations which finally culminated in Revere Copper and Brass Incorporated. This organization now operates seven plants, comprising better than 25% of the copper, brass and bronze mill capacity in this country.

---

---

Revere Copper and Brass Incorporated  
General Offices, Rome, N. Y.

# WARMTH... AND BEAUTY TOO!

Women buyers demand beauty as well as utility in the things they put in their homes. Refrigerators and gas ranges, even water heaters, sell quicker because they are good to look at.

Here is a heater that looks like a clever console radio... a useful piece of furniture that brings beauty as well as comfort to the very finest homes. It is finished in natural grain walnut, obtained by photography... takes up little space... stands close to the wall like a book case.

Top and sides remain cool to the touch. It's safe for children. Remarkable in its rapid heating results... and users can enjoy its practical comfort and beauty twelve months of the year... not merely throughout the Winter heating season.

Write or wire today for full particulars.

## PAYNE Console HEATER

MANUFACTURED ONLY BY THE PAYNE  
FURNACE AND SUPPLY CO., INC.  
BEVERLY HILLS, CALIFORNIA



THERE'S A PAYNE HEAT  
SYSTEM FOR EVERY  
CLIMATE AND BUILDING

Warehouse—  
Buffalo, N. Y.

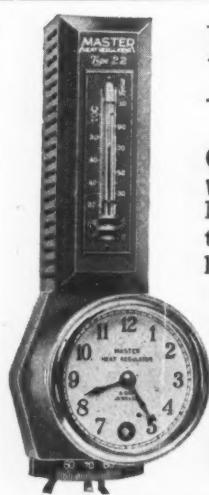
Jobbers in All  
Principal Cities

Dealers Everywhere



August 16, 1930

Say you saw it in AMERICAN ARTISAN—Thank you!



## No daily attention —that's what sells it

STEADILY sales are gaining for this master of heat regulators, Type 22. It is Full Electric, but costs little more than a hand-operated regulator. It will PAY you to investigate the

**MASTER  
HEAT REGULATOR**

Type 22

**\$80** Full Electric;  
8-Day Jewelled Clock

Full Electric Motor—no hand operated devices to forget.

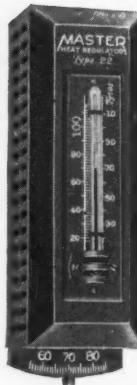
8-Day Jewelled Clock. Automatically turns heat on and off, morning and night.

Closer Regulation. Acts instantly when heat changes 1° or less if desired.

Flawless construction—long life—dependable service. Made by the manufacturers of the MASTER gradual operation Heat Regulator.

Good-sized profits are waiting for dealers who handle the Master. Write for details.

**WHITE MFG. CO.**  
2362 University Ave. St. Paul, Minn.



Full Electric,  
without clock \$55

## KU-NO WARM AIR REGISTERS



Sell attractiveness, air capacity, easy operation, and easy cleaning with the KU-NO Register. Give us your jobber's name

KU-NO REGISTER MFG. CO., ST. LOUIS, MO.

ACCEPTED on sight by dealers and home owners. This new register construction is making a big hit. Its attractive two-tone color finishes are making many register replacement sales.

Face with wing attached is removable—snap in and out of frame. New patented locking device holds wing in any position without jar or vibration.

It's the newest most practical register you've ever seen—write for samples of colors and circular.

**LAMSON  
& SESSIONS CO.**  
CLEVELAND, OHIO

Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

**only \$48 installed**

### All Electric—plus 4 Exclusive Features

- 1 Automatically checks furnace in event of electrical current break.
- 2 Automatically re-engages after power failure.
- 3 Gradual operation of draft and damper. No banking up of gas or smoke.
- 4 No weights, electric motor, clock or dry batteries—nothing to oil. Simple to install. Thousands are in use. Listed as standard by Underwriter's Laboratories.

Dealer Price  
**\$22.75**  
f.o.b. Quincy, Ill.



## SHEER COMFORT heat Regulator

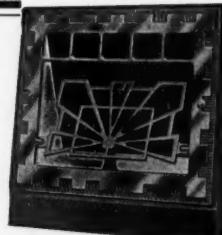
Ask your jobber or write

U. M. Sheer Co., 213 Hampshire St., Quincy, Illinois

Our customers tell us that this register doesn't streak the walls and that it is quickly installed.

**ALL THIS AND MORE,  
AT NO GREATER  
COST**

"It's different  
from all the  
rest"



**SYMONDS REGISTER COMPANY**  
3117-23 Minnesota Ave.

St. Louis, Mo.

## SIMPLIFY YOUR SOLDERING

The new Kester Flux-Core Solders reduce soldering to its simplest form. No separate application of flux—it's in the core. Handy, economical, certain. You can double your efficiency and cut costs in half with Kester Self-Fluxing Acid-Core Solder. Made in many gauges. Put up in 1, 5 and 20 lb. spools. Trial samples free.

From All Jobbers

**KESTER SOLDER COMPANY**  
4241 Wrightwood Avenue  
Incorporated 1899  
Chicago

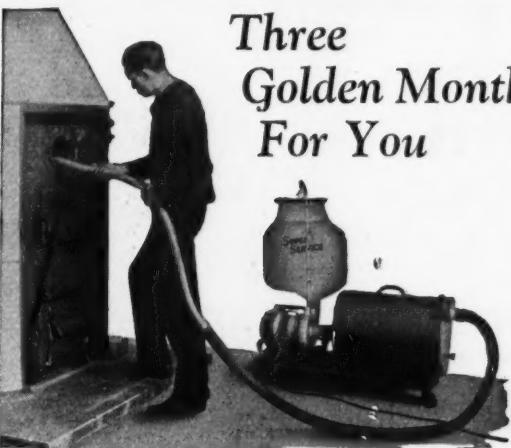
**KESTER**  
FLUX-CORE  
SOLDER

## Let's tackle that difficult warm air job together—

NOBODY knows everything and progress comes only by studying conditions.

Perhaps you have a customer who still insists that the warm air installation you or someone else put in is not working right.

If you have failed to find the reason send the plans and all data you have on the job to AMERICAN ARTISAN. The problem and plans will be published and expert warm air heating engineers will offer their solutions.



Our one-man outfit makes low overhead

OWNERS of speedy Super Suction furnace cleaners will make a big clean-up before snow flies again. Cleaning—repairing old furnaces—selling new ones; money coming in three ways.

Every furnace user is ready now to talk to the man who can save him money on next winter's fuel bill. Dull times make home owners receptive to such economies. Your selling is easy.

You can try a Super Suction for three days FREE.  
Write at once for details

THE NATIONAL SUPER SERVICE CO.  
1944 North 13th Street  
Toledo, Ohio



Order a trial can now—it will not sour—keeps any length of time.

WESTERN MINERAL PRODUCTS CO.  
OMAHA (Formerly Larsen-Bennett Co.) NEBRASKA

### A new furnace paste FOR BETTER, NEATER AND QUICKER WORK

#### Non-Cereal—Non-Souring

Asbestos Paper will not absorb it as it does cereal pastes. Paper does not become soggy—not so apt to tear.

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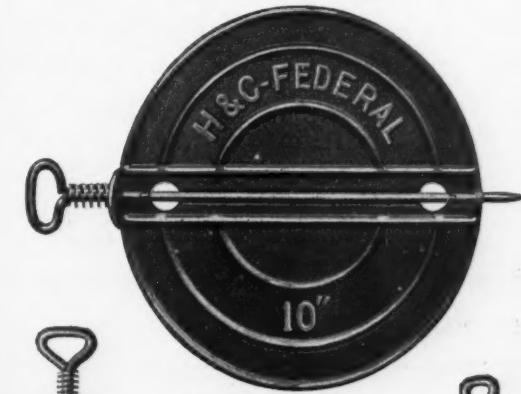
NEW YORK

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By all means investigate this money-saving line of quality-built furnace accessories. Complete as it is, it offers you the advantage of buying the majority of your requirements from one source, thus saving an appreciable amount in freight charges and simplifying bookkeeping at the same time. Have a shipment of dampers come through with your next register order and enjoy the benefit of combined freight allowances.

Write for Catalog and Prices



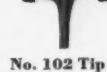
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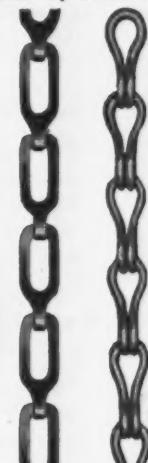


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Factories at Holland, Mich., New Britain, Conn., Nashua, N. H.

Entered as second class matter, January 29, 1930, at the Post Office at Chicago, Ill., under act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record.

Founded 1880

# American Artisan

THE WARM AIR HEATING  
AND SHEET METAL JOURNAL

Yearly Subscription  
Price:  
United States \$2.00  
Canada \$3.00  
Foreign \$4.00  
Single Copies 25c

Published EVERY OTHER SATURDAY—to Promote Better Warm Air Heating and Sheet Metal Work

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## PORTER-SPOFFORD-LANGTRY CORPORATION

139 North Clark Street, Chicago—Telephone Central 7670

Fred D. Porter, President      John C. Langtry, Vice-President      Howard H. Bede, Secretary  
Editor: Joseph D. Wilder      Business Manager: Etta Cohn  
Circulation Manager: John R. Hannon

Advertising Representatives:  
Charles E. Kennedy — J. F. Johnson

New York Office: 295 Madison Avenue, Room 1109, Tel. Ashland 5342  
Frank G. Cambria, Eastern Representative

Vol. 99, No. 17

CHICAGO, August 16, 1930

\$2.00 Per Year

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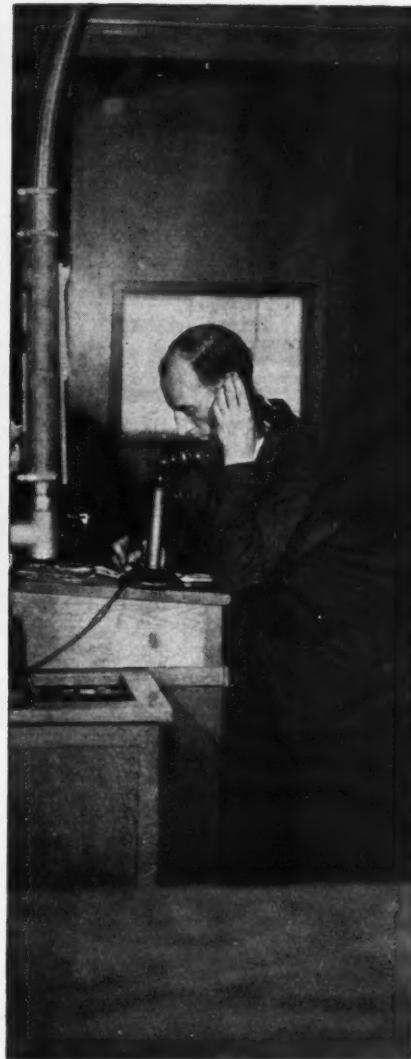
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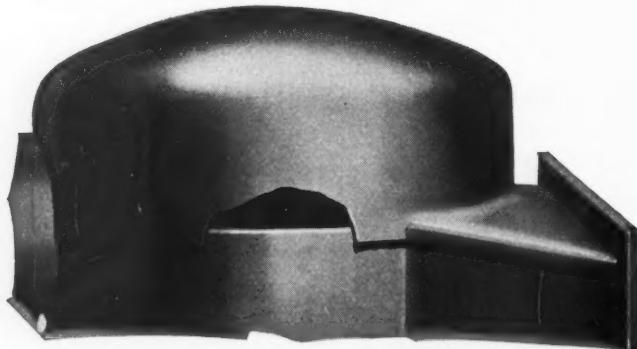
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BETTER FOR BURNING OIL      BETTER FOR BURNING COAL



It requires a pressure of 875 tons to form the one-piece heads of the new Sunbeam Steel Furnace. These heads are made of  $\frac{3}{4}$ -inch boiler plate. It is not necessary to heat them because of the tremendous capacity of the gigantic presses which perform this operation.

## NO JOINT AT TOP OF DRUM OR POUCH

The head of the new Sunbeam Steel Furnace is made from a single piece of boiler plate. There is no joint at the top of the pouch. No escape for smoke, soot or fumes. Extra strength, extra thickness where these qualities are most needed.

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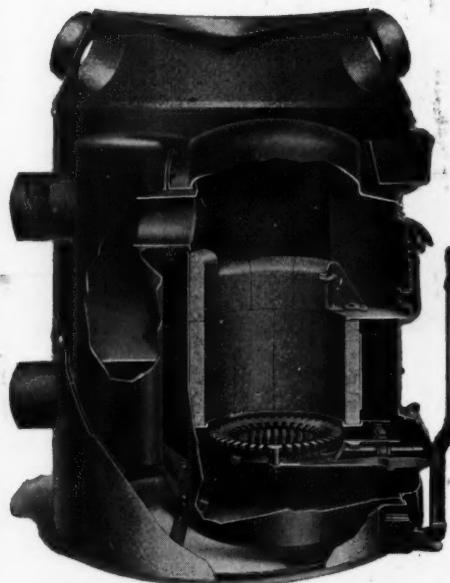
Please send complete information and prices on the new Sunbeam Steel Furnace.

Name.....

Address.....

City and State.....

A-9



The cutaway view of the new Sunbeam illustrates the innovations listed opposite and many others as well.

## SUNBEAM WARM-AIR FURNACES

A Furnace for Every Requirement—Quality and Price, Both

**The FOX FURNACE CO.**  
ELYRIA, OHIO

A Division of American Radiator and Standard Sanitary Corporation

Say you saw it in AMERICAN ARTISAN—Thank you!



# American Artisan

THE WARM AIR HEATING  
AND SHEET METAL JOURNAL



Vol. 99

CHICAGO, AUGUST 16, 1930

No. 17

## The Pot Begins to Boil

**A**NYONE who has been reading the advertising pages and the news section of AMERICAN ARTISAN these last few months must realize that the warm air heating pot is beginning to boil.

All over the surface bubbles are breaking. These bubbles represent new gas furnaces, new oil burning furnaces, new and simplified automatic control equipment, more fool-proof humidifiers, great improvements in the straight coal burning furnaces, both cast and steel. And many more.

All this activity surely is a good sign. Where there is so much surface activity there must be many times more out-of-sight activity which we can only guess at now.

It should be a healthy sign that considerable of this activity is due to new organizations, unknown a few years ago, or off-shoots from some old line company. The introduction of new equipment should be a good thing for these new companies and at the same time these new products ought to stir older companies to greater interest. There can be no greater incentive to get out and do things than the introduction of new and needed equipment by companies younger in business years.

There can be no denying that heating is taking on greater significance. Perhaps the fever of the after-the-war period is giving way to more sober thoughts in which comfort at home will be given more consideration. In any event the public is decidedly interested in oil burners, gas furnaces, control over their heating plant at all hours of the day and night, stokers, fans and blowers, etc.

Just think over these facts for a minute. Oil burners are not new. They sold like wildfire for a time and then the cost of maintenance broke thousands of dealers. Why? Because the burners were put into any old kind of a heating plant, regardless of its condition, and without thought of efficiency. The result was that the burner folks sidestepped the furnace. What was needed was furnaces designed especially to burn oil. Now we have them and the heating man can logically sell the combination of oil burner and oil burning furnace.

The same holds true of gas. Conversion burners of the most slip-shod construction and design appeared right along with the pipe lines carrying natural gas. Put in furnaces the gas bill was tremendous. The public washed its hands of this sort of equipment. Now especially designed gas furnaces, either fan connected or gravity, are the last word in efficiency, rating as high as 87 per cent. The conversion units, at the same time, have been made over to really heat and conserve gas consumption and are now in great demand.

It should not be long before every furnace, regardless of its type will have improved humidifiers. We did well with the water pan, but recent developments have shown us that there are better and more uniform methods of putting moisture into the air. This will directly meet the public's demand for this manufactured weather they are reading so much about.

And the bubble which has been hiding temperature control is decidedly hot right at present. Every home owner wants to have some dood-dad which lets him sleep another half hour in the morning. And even more important, lets him get up in a warm house and not a third class refrigerator. Almost every week some new unit designed to furnish this control is announced. Perhaps all of the designs won't survive. No doubt most of them will survive and be perfected and improved so that in the next few years the public can have any sort of control they want, mechanical, electrical, manual, clock, temperature, etc.

Perhaps it is not altogether a coincidence that these great developments are all bursting into the heating man's and the public's range of vision during one short period of time. There is no use denying that for many, many years the warm air heating industry was a "hot air" industry in truth. We made the same kind of furnaces we made forty years ago; we refused to see that all kinds of fuels were becoming popular and that we would have to design and build to meet new trends.

So now the pot is beginning to boil and in the bubbles we can expect such changes among our manufacturers, dealers and installers as will put warm air heating on the map.

# The Ninth Article On Cost Accounting

BUSINESS men may have varying opinions on many subjects, but there is one subject on which a great many men do agree. That is their universal opinion that anything they don't understand is *complicated*.

A number of the readers of the ARTISAN have said that our plan of accounting for costs in warm air furnace shops is too complicated; that there are too many books; that they would like cost data to be accumulated *while the job is in progress*; and various other complications. Of course, a plan of accounts designed to fit a given industry will, of necessity, be a compromise in some respects. My series of articles has covered, so far as it was possible, the average small shop, without outside lines, and I shall now attempt to disprove all of the charges quoted above.

#### *Is the plan complicated?*

A watch is, in my opinion, a very complicated mechanism. To the watchmaker it is a very simple arrangement of springs, gears and other parts. The difference lies in the fact that all I know about a watch is how to wind and set it. The watchmaker knows the name of each piece and its part or purpose. It is merely a matter of knowledge and the application of a little study to the specific thing under consideration. No doubt, if I had an opportunity and someone to teach me, I could learn to take my watch to pieces and put it together again so it would run. As it now is I could take it apart, but I could not put it together again. I have not learned its parts.

Now let's look at this set of books, and see just how complicated they are. Please remember, if you



Joseph G. Dingle, C. P. A.

will, that I have been writing, presumably, to warm air furnace men—who know warm air furnaces—but do not know bookkeeping. I believe the majority of those who have called my plan of bookkeeping *complicated* have done so without giving serious thought to the matter. Without previous knowledge in bookkeeping they have attempted to look at the whole thing—not piece by piece. They have taken it

apart, but could not put it together so it would run. Those fellows have been unjust in their criticism, I believe. They blame—not themselves—but the plan. It would be like blaming the watch instead of myself for my inability to put it together so it would run.

Now, to prove that bookkeeping is not complicated.

In Article I (April 12th issue) we explained the various forms your money assumed during its trip through your shop. We gave such transactions as might be expected on the opening of a new business. Review Article I and you will see how simple those transactions are. Merely a recording of the moving of value from one place to another, or, one account to another.

In Article II (April 26th issue) these transactions given in the first article are merely posted to ledger sheets or accounts. This article really supplements Article I.

Article III (May 10th issue) takes up the problem of building up costs as the job progresses. If I were to ask you how a job pro-

MATERIAL TICKET				
CHARGE JOHN SMITH		JOB WITH THE		
FOLLOWING MATERIALS:				
PIECES	DESCRIPTION	POUNDS	PRICE	AMOUNT
1	furnace		135.00	135.00
1	Casing less hood		815	815
	Galvanized iron	100	12	120.0
1	Smoke Pipe			3.50
	Total			159.25
		POSTED 5/20		

APPROVED Joe Pearson SIGNED Arnold Gering  
Your bookkeeper can't be sure of what materials have been taken to a job unless your men fill out the material ticket. Here is the ticket filled out for the John Smith job

TIME CARD  
EMPLOYEE ARNOLD GERDING  
WEEK ENDING MAY 24 1930

The Time Card should show, by the week, just where each of your workmen spent his time. The totals must equal your pay roll and also equal your hours charged to each job

gresses, you would say that the first step after securing the job is to assemble the necessary materials and deliver them to the job. How does our *material ticket*, illustrated here on page 20 of this issue, fill the need for making up a list of material to be delivered to that job? Remember, please, that this ticket is to be used for all kinds of jobs, so we could hardly print a list of standard items and then just fill in quantities. This material ticket provides a means for notifying the office that certain specific items have been taken to a certain job. We have the quantities and provision which is made for prices and amounts, also signature of the employe taking these goods to the job. This mate-

rial ticket certainly cannot be called *complicated*.

In this same article we take up a discussion of the labor charges. See time card illustrated. Each workman records his own time on each job in such a way as to enable the office to charge the jobs worked on by that man. What's complicated about this time card? It is a simple analysis of the work done by the employe, so laid out that we can charge the different jobs.

Now take a more careful look at our cost sheet. It is on this form that the material tickets and labor costs are accumulated as *the job progresses*. This cost sheet is intended to be charged with all material tickets *daily* and with all labor costs at the close of the week when the time cards are turned in. Look at this cost sheet as a container into which flows material and labor items as they appear on material tickets and time cards.

There is nothing *complicated* here. Now turn to Article IV (May 24th issue) and you will find a material ticket showing certain materials going out on the John Smith job. You will find Arnold Gerding's time card filled out for but one day. On that card you will find he worked from 8 to 12 and from 4 to 5 on the John Smith job—a total of 5 hours. Look then at our cost sheet and you will find our bookkeeper has posted the material ticket and Arnold's time to the John Smith job. Before we posted the time card, we showed \$159.25 as a mate-

COST SHEET										
JOHN SMITH			JOB		No. 1					
DESCRIBE JOB										
INSTALL FURNACE, AS PER ESTIMATE NO 49										
DATE	DESCRIPTION	POUNDS	PRICE	HOURS	MATL	LABOR	TOTAL			
5/20	FURNACE		135.00		135.00					
	CASING, LESS HOOD		875		875					
	GALV. IRON	100	12		1200					
	SMOKE PIPE		350		350					
20	ARNOLD GERDING			500			625.16.55.50			

From the material ticket your bookkeeper makes out a Cost Sheet. On this Cost Sheet the items from the Material Ticket are posted and totaled. Labor is also accounted for on this ticket.

GENERAL JOURNAL							MONTH OF		1930	
COST SALES	COST SALES	WORK IN	GENERAL	DATE	DESCRIPTION			GENERAL	WORK IN	
LABOR	MATERIAL	PROCESS							PROCESS	
		150.00			Work in Process					
					Materials Inventory			150.00		
					Cost of materials used					
		250.00			Cost Sales Labor					
					Cost Sales Material					
		300.00			Work In Process					
					Completion during month			550.00		

The General Journal serves mainly as a sorting rack to hold work which is going through the shop, but does not fall under on specific job. The text explains this fully

rial charge. After the labor item of \$6.25 we have a new total of \$165.50. There is the cost as it accumulates, and in very usable form. By the use of material tickets and time cards, one man or a dozen men can keep the office fully advised concerning materials taken out to jobs, also concerning where they worked each day. The bookkeeper merely uses the cost sheet as a sorting and accumulation medium. Each form and each employe does its or his part at the proper time and there should be no confusion and no waiting for the other fellow.

Next comes the question of our expenses. Article V (issue of June 7th) names and explains these accounts. You can not call these accounts complicated. They are regu-

lar every-day expenses and by the use of a few more expense accounts, we do not increase our work. In fact we compile usable data concerning expenses of all kinds. The next article (VI) continues the naming and explaining of the accounts we expect to use. Consider, if you will, that the chart of accounts is but a file in which we must put everything. The bookkeeper must fit every transaction into two of these accounts. The transaction must involve the transfer of value from some one account into some other account. Suppose you buy some material on open account. We find we have moved value to material inventory from accounts payable. You pay for the material. We move value to accounts payable from the

bank. And still I maintain we have no complications. Merely simple transactions of the moving of value from one place to another.

Now I feel sure you are sure you have me where I must admit we have complications. We are now looking at Article VII, wherein we describe and illustrate the journals. I can hear you say there are four of them. Well, what of it? I am not yet willing to admit the question of complications. I ask you how many pairs of shears or snips you have. You will say three, four or five. Why so many? Don't the men lose a great deal of time looking for the right pair? I know your answer—that each pair of snips is for a special purpose. Well, if you will look over these four journal forms,

SALES JOURNAL				MONTH OF June				1930			
DATE	ACCOUNTS RECEIVABLE	DESCRIPTION		SALES OF LABOR	SALES OF MAT'L	DEBIT	CREDIT	DEBIT	CREDIT		
	DEBIT	CREDIT									
8	350.00										
8		Henry Brown									
8	200.00										
8	100.00										
		John Smith									
		Frank Jones									

The Sales Journal sheet is a condensed statement of what we are going day by day. For example, on this page we show three transactions. To Henry Brown we sell a \$350 job. The \$350 is "debited" under Accounts Receivable, for we must collect for the work. This \$350 is split up and entered under "credit" at the right. Here \$200 is accounted for under Labor and \$150 under Material. If the sale is all material, as for John Smith, no labor "credit" appears

you will find that they, like your snips, are each for a special purpose. One deals with purchases, another with sales, the third with the receipt and disbursement of cash and the fourth is for general purposes not falling within the three special purposes. These four journals may be kept in a simple binder—the same as your four pairs of snips are kept in a single tool

accounts and our four journals all lead, step by step, to the end where we want to look at some figures and find our profit or our loss. Read carefully Article VIII and pay particular attention to the two statements there shown in skeleton form. Does the operating statement tell you anything about your business? Look at the cost of sales of material and of labor. The figures that will

understanding the several steps, takes all the *complications* out of the problem. And I feel sure you will also agree that we do compile our costs *as the job progresses*.

If you now have any doubts concerning the ability of this set of books to thoroughly record the transactions, of your business—as the transactions occur, please write me fully and I will be only too glad

C 1

CASH JOURNAL

(DOUBLE PAGE FORM)  
LEFT HAND PAGE

MONTH OF June 1930

ACCOUNTS RECEIVABLE	DISCOUNT ALLOWED	CASH	DATE	DESCRIPTION	CHECK NO.	BANK DEBITS	CREDITS
		DEBIT CREDIT					
35000	700	34300	10	Henry Brown			
			11	Note Payable - FNB - Due 7/1/30		50000	
2500		2500	11	Cash Sales			
		36000	11	Deposit		36000	
			10	At Landlord Rent to 1/30/30	1		5000
			10	Mugwum Furnace Co.	2		14600

The Cash Journal is a double page form. Let's look at Henry Brown's account again. Under Accounts Receivable, which in street language means what our customers must pay us, we enter the item of \$350. This is "credited" to Brown. But we allow him 2 per cent for cash. This is \$7. This \$7 appears in the next column. Then \$350 less \$7 leaves \$343, or the amount we really received. This shows up under the Cash heading

The right-hand sheet of the pair contains headings for Accounts Receivable and for our various expenses which have to be counted into each profit; in other words, our Overhead. The text explains how the various items shown here are taken from transactions and placed under the proper heading.

kit. As to their uses they are no more complicated than are your snips. You are either dealing with a purchase, a sale, a cash transaction or a general item. These special purpose journals, like your special purpose tools, merely make for more efficient handling of the work.

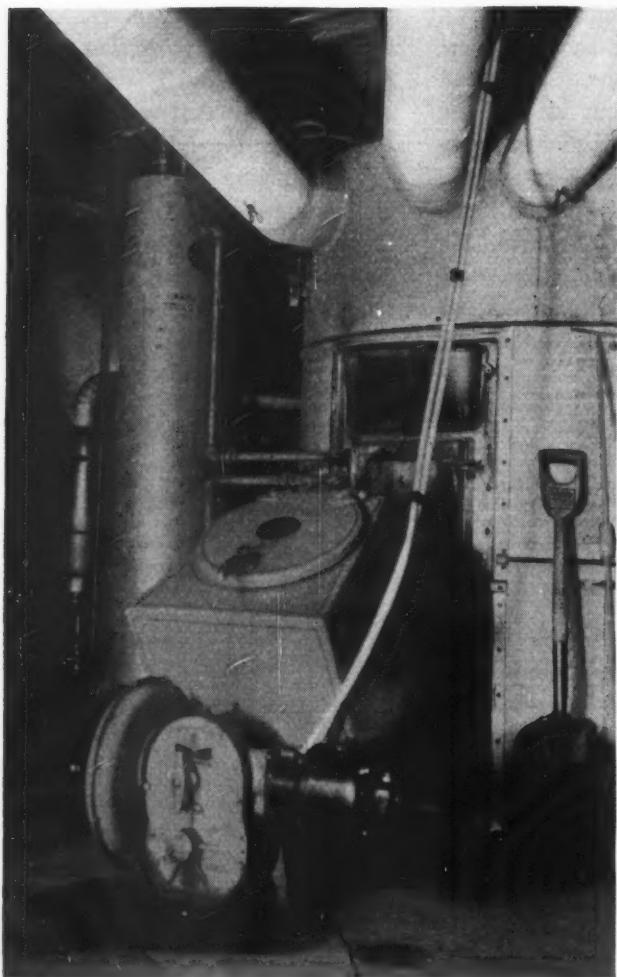
After all is said and done, a set of books must give us complete and accurate data concerning operations. Our material tickets, time cards, cost sheets, our expense and other

appear here must first come from our material tickets and our time cards. From these they clear through the cost sheets and upon completion of the job we have a *sale of labor and a sale of material*. Through our general journal we pass from the cost sheet the cost of material and the cost of labor.

After all, what you thought was too complicated, does not now seem complicated. Viewing the whole matter step by step and thoroughly

to give you personal attention. It is the purpose of these articles to lay out and explain thoroughly a simple yet complete set of books for the average sheet metal shop. If there is any question you would like answered, please command me. The **AMERICAN ARTISAN** and I have attempted, through these articles to bring to you—the average small shop owner—the matter of book-keeping, in terms you could understand.

(Continued on page 48)



# The Braden Mfg. Co., Terre Haute, Ind. Has Sold 82 Stokers Averaging \$1,000 Each To Homes, Stores and Factories

This compact stoker installation does all the work of keeping the house warm except fill the hopper. Temperature and operation control are automatic

DOWN in Terre Haute, Indiana, there is a splendid example of the way people take to automatic heat. Terre Haute is ringed with soft coal mines. Soft coal of the size burned in domestic stokers can be bought for just a few cents over \$2.00 a ton. Oil has had its periods of intensive promotion and is represented by quite a number of oil burners in Terre Haute homes. Gas, on the other hand, is artificial and used in heating is expensive.

The result of this situation is that gas as a domestic heating fuel is out of the picture. Oil is liked and used, but cannot compete with coal in price. As a consequence, coal stokers in houses are enjoying a boom in popularity.

Behind this scene of stoker acceptance is a firm well known to the warm air furnace and sheet metal industries. The firm is the Braden Manufacturing Company, Terre Haute, manufacturers of the Cham-

pion line of mitres and fittings. The Braden company, through a city organization within its personnel, is the agent for the Iron Fireman stoker. The company has been installing the stoker for the last two years and in that time has sold and installed 82 domestic stokers. These

units are in homes of all price ranges and types, in many of the downtown office and commercial buildings and are now working into the manufacturing plants of the city.

What the Braden Manufacturing Company has found out about stoker selling, servicing and installing fits right in with the nationwide problem of providing the American public with automatic, warm air heat.

Let's first consider the matter of selling stokers.

Of course, with the coal price situation existing in Terre Haute, the cost of heating the home is one



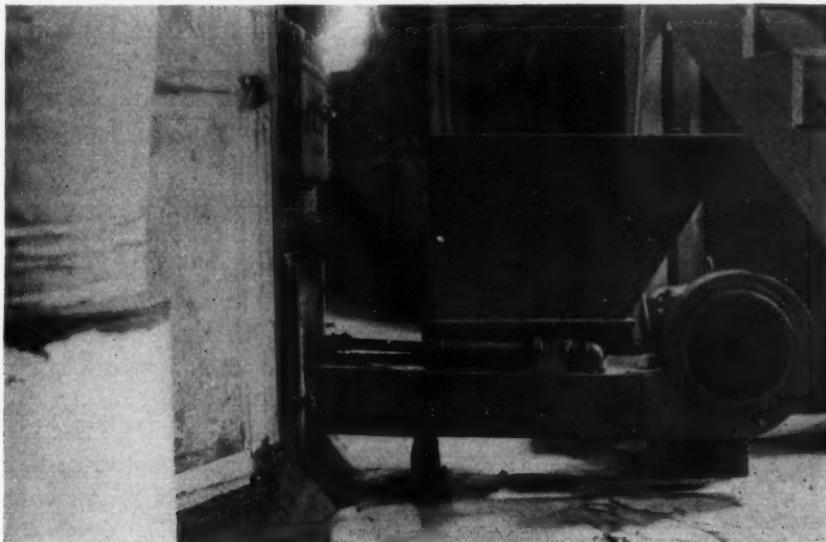
This is the house in which the stoker shown above is installed. The heating bill for an entire season runs very little more than \$60.00 burning cheap coal. All the man of the house has to do is fill the hopper each morning or, in mild weather, every other day

of the big selling points always brought to the attention of the prospect. Some of the illustrations shown with this article illustrate the kind of homes these stokers are going into. Taking an average six or seven room house, of good construction, and with a modern warm air heating system, the cost of fuel for a heating season, burning local stoker coal, is from \$50 to \$60 a season.

In most communities this would be considerably below average cost, but illustrates how local conditions aid or hinder various heating fuels.

The stoker manufacturer has, as a part of his dealer service, an elaborate set of direct mailing pieces. These are designed to show all the features of stoker firing by both pictures and text. For twenty-five and thirty-five cents a name the company mails out ten pieces of

**Below—This is an older type stoker. Its lines are not as good looking, but its operation leaves nothing to be desired. The hopper is an oversized one, built by the Braden Company**



literature at intervals. The dealer pays the cost and also furnishes the names. The Braden company uses this service. Names of property owners are selected from tax lists and the names are then checked against all available sources to ascertain their financial ability to pay for a stoker. If the home owner meets the financial requirements his name is sent in and the

direct mail begins to come to him.

The city organization of the company has a full time salesman who works on the same list as given for direct mail. As the mailing pieces are received the salesman calls and works on the prospect. These calls are continued as the mailing goes on, the idea being that as the mail campaign draws to a close more

surest ways to close a sale. This is true where the prospect is invited to see a stoker owner, and doubly effective where owners talk to their friends about their heating plants. If their jobs are satisfactory they are strong boosters for stoker heating. They relate their experiences and get their friends interested.

The last argument is the guaran-



**This is the house where the stoker below operates. It, too, is warm air heated. The furnace is quite old, but with a stoker its heating capacity keeps the large house warm regardless of outside temperature**

tee. The stoker is sold on a satisfactory-or-taken-out basis. If the stoker works, the buyer pays for it; if he isn't satisfied the stoker is taken out and no money changes hands. Few home owners who want automatic heat can resist such a guarantee. So far, the company has not had to take out a single installation.

It is interesting to note that the cost of the average stoker installation put in by the Braden company is just over \$1000.00. This average, of course, takes into account both the smaller residence job and the larger and more costly industrial and commercial installation.

Since the first stoker was put in, many things about installation and servicing have been discovered. In the home plants, keeping the hopper filled with coal is one of the things every prospect wants to

and more effort is made to close the sale.

A feature of the personal sales is the use made of existing installations. The salesman tries to find if the prospect knows any of the citizens who have stokers. If he does, he is invited to view these stoker installations and talk to the owner. The company has found that word of mouth advertising is one of the



This is probably the most expensive home in Terra Haute. It uses a stoker to provide automatic heating and the heating bill has been substantially reduced through use of cheaper fuel and uniform control

know all about. His first impression is that it is just as much trouble to fill a hopper as it is to fire the furnace. The salesman then explains how labor is saved with the stoker. In the first place the hopper has to be filled only once in 24 hours in mild weather and in severe weather not more than once in 12 hours. Filling the hopper is not like firing the furnace. In the first place no care has to be taken to get the fuel in evenly or to spread it out. The coal is shoveled into the hopper and that is all there is to it.

In cases where the owner wants his filling to be at longer intervals, the shop puts on a larger hopper, built of galvanized iron with angle iron frame such as can be made up by any sheet metal contractor. This larger hopper means more coal at a time, but fewer fillings.

The big talking point about the stoker is that the machine tends the fire. The coal is pushed into the fire pot, forced up into an underfed fuel bed and kept at constant temperature by forced air from the blower. So thorough is combustion that only clinker comes out and this can be removed easily.

The temperature of the fire pot is some 500 degrees hotter than with ordinary hand firing, with the result that more complete burning takes place and more heat units per ton of coal are extracted from the

fuel. This eliminates smoke and soot and is a big selling point.

The installation is watched carefully and each job is undertaken as though it were the only one of its kind. The grates are taken out and a sand cushion topped with fire brick is placed around the fire pot of the stoker. If the furnace is unlined fire brick are placed around the inside of the fire pot to keep



Another of the fine homes using stoker operation with warm air heat

the intense heat from affecting the metal and to provide a material for holding the heat just as long as possible after the stoker begins to operate on low.

The installation of the automatic controls is gone over very thoroughly. The first floor thermostat, the company has found, is most important, and the location of this instrument determines to a large

extent how satisfactory and economical the heating service is. The engineer endeavors to place this thermostat in the center of the house, that is, away from outside doors which are opened frequently and also away from any cold air draughts which may be caused by doors being opened. In addition, the room where the most uniform heat, such as the living room, is selected for the instrument. The thermostat is then set at whatever temperature the owner wants, say 72 degrees for daytime and 60 degrees for night.

This first floor control is supplemented by a furnace control on the furnace bonnet. This serves two purposes, to keep the temperature inside the furnace from getting too hot and from getting too cold. Usually the Braden men set it for a high of 300 degrees. This permits the furnace to get plenty hot, but keeps the heat below that temperature when the furnace begins to get smelly. As a low temperature a degree is selected which will keep the furnace from getting cold and requiring complete heating, but not so high that there will be no "coasting" period in the operation.

This attention to installation details and extensive "trying-out" of ideas has resulted in uniformly good installations which have no kick back.

About one-half of the installations are in industrial or commercial establishments. These jobs require absolute dependability of service and have demanded that the job be put in right. Because of this necessity all possible ideas have been tried out and discarded when found inadequate and adopted when proved advantageous.

One of the most interesting of the industrial installations is one in the experimental stage in a large enameling plant.

The plant makes kitchen enamelware. The enamel is put on the utensils and allowed to dry. The pieces are then placed on a rack holding many pieces and the rack is moved into the furnace. The

temperature inside the furnace for baking is 1600 to 1700 degrees. The racks are put into and taken out of the furnace in five-minute periods. This means that the furnace is open for escape of heat every five minutes for a part of a minute while the racks are coming out and going in. In order to get the best baking the temperature cannot be permitted to fall and must be at required temperature all during the time the pieces are inside.

For several years the company has used artificial gas as a fuel. Five furnaces are operated and the gas bill has been some \$72,000 a year. This is at the rate of \$40 per day, per furnace.

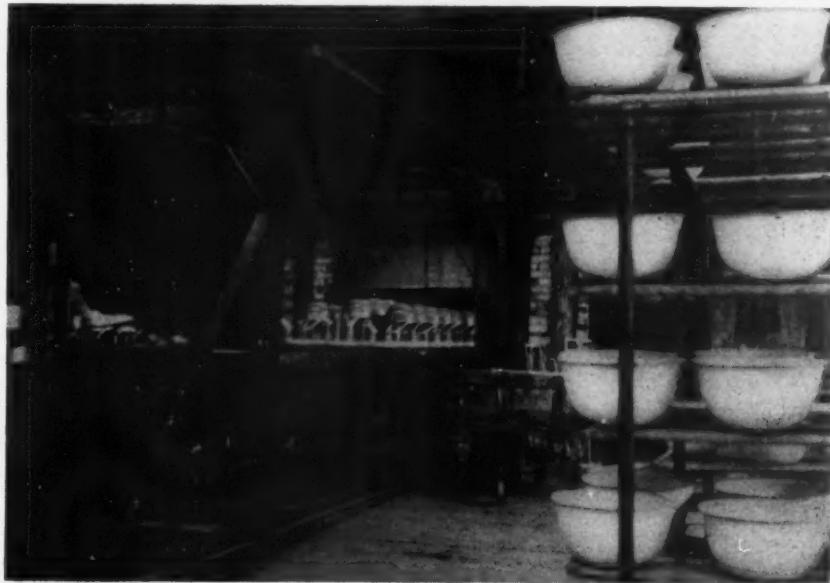
Just a short time ago a large size stoker was placed in operation on one of the furnaces to see what it would do. After many days' operation, charts kept all during the day showed that the stoker was costing \$12 a day per furnace or almost one-quarter the cost of gas. This cost included the cost of a fireman

to attend it and calculated depreciation on the investment. If all five furnaces were stoked, two firemen could handle all five stokers, which would be a saving.

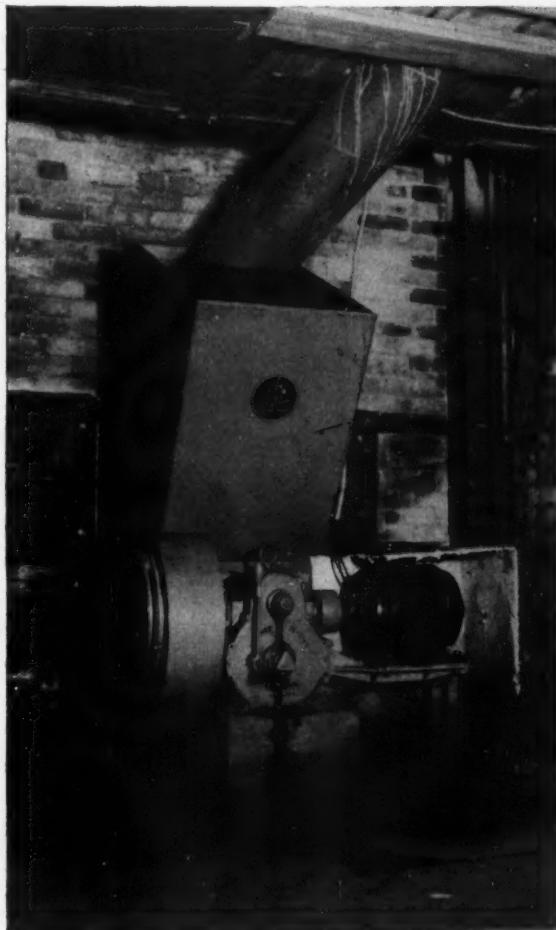
The operation of the furnaces with the stoker has been very satisfactory. The temperature has been maintained without trouble in spite of the fact that a picked crew and

the most heat reducing pieces were kept going through the furnace all during the test.

It is interesting to note that this sale of stokers has brought about a new feeling about warm air heating throughout Terre Haute. Home owners are beginning to want automatic heat and at the low cost stoking makes available. The use of



Above—A view of the charging floor of the enamel ware factory. The charge is just coming out of the furnace. A furnace temperature of 1,600 to 1,700 degrees was maintained continually for a long test run



Left—This is the large stoker used with the furnace. Its hopper is fed automatically from coal bins above the furnace floor. One fireman can tend two or three stokers. This stoker reduced the heat bill from \$40 a day to \$12 a day

the stoker has made an entirely new picture of heating, a picture which shows homes being heated with a low priced fuel, at low cost, without fuss or trouble, with little attention required and almost automatic operation.

Some very interesting results from stoker operation have been discovered. For example, a stoker placed in a hotel has returned an average saving of 16 per cent a month and has made it possible to eliminate one fireman. It has also eliminated soot and smoke.

A stoker was sold to a chicken farmer. The uniformity of the temperature saved from 5,000 to 10,000 baby chicks over a year's time and this in addition to the saving in heating cost.

A stoker placed in a lodge hall has proved a very satisfactory investment. Where previously the rooms were cold late in the evening and cold in the morning, the fireman now fills up the stoker at 6 P. M. when he goes off duty and

(Continued on page 48)



The pitch of the roof is so steep that ladders had to be used in every placing operation. This view shows the roof with all the sheets in place

**A** SHORT time ago we published an article on a large aluminum roofing job under way in Milwaukee. About the same time this job was started a second, and equally interesting, aluminum roofing job was begun.

This second job is also on a church, the Holy Ghost church, located in a residential neighborhood. The exterior of the church is of brown-toned stone and the interior has a unique vaulted ceiling design. The greatest difference in the jobs is in the lines of the roofs.

In the first job the pitch of the roof was comparatively flat, workmen could walk up and down and across the roof without the aid of ladders. In this second job, however, the roof is so steep that working on the roof is impossible and ladders have to be used in every step of the laying operations. This steep roof slowed up operations and increased the labor of applying the sheets. And when the time of the year is taken into consideration and the brisk winds of March and April are counted it can be seen that the

## ALUMINUM Is Gaining Favor With Architects

workmen did not have any easy-chair task in putting on this roof.

One thing the architect did for the roofing man, however, he ran his wall buttresses almost to the top of the main eave and projected them out for about three feet. This cap to the buttress made an excellent scaffold support and uprights were not needed.

The architects of the building, Eschweiller and Eschweiller, Milwaukee, in drawing the plans were up against the problem of color in the roofing material. The color was particularly important since by the design of the building the roof is one of the most outstanding architectural features of the structure. Unlike some buildings this roof stands out as far as the church can be seen and persons viewing the building will be very apt to consider the roof as one of the features of the church.

The color of aluminum appealed to the architects. In addition they were interested in a material which would retain its color indefinitely, regardless of atmospheric conditions. This retention of color is claimed to be one of the features of aluminum. The makers say aluminum regains its color after every washing by the rain.

It also happened that one of the architects connected with the design of the building had cooperated in the design of the St. Louis Municipal Court Building on which an aluminum roof had been placed. He had been very much impressed with the color and wearing possibilities of this material and sug-

# As a Material for Distinctive Roofs

gested it for the Holy Ghost church roof.

The material was investigated. Installations were reported on and where possible visited. It was found that the material was giving excellent service and that so far as could be ascertained the retention of color was borne out. The investigation was carried further with a view to finding out how easily the material could be worked in the shop. It was found that the material worked easily and that any of the good roofing and sheet metal contractors of Milwaukee would have no difficulty in handling the material even though it was new.

The contractor on the job is Biersach and Niedermeyer of Mil-

waukee. This firm has been known in the roofing business for many years and has a reputation for quality workmanship.

As purchased by the contractor the aluminum came in long rolls of varying widths for easiest forming into roofing sheets, gutters, conductor heads and downspouting. These lengths of metal were cut into 10-foot sheets for the roof and formed for batten type installation.

The edges of the sheet are turned up 2 inches, or the height of the nailing batten and then turned in about  $\frac{1}{2}$  inch for the nailing clip and the batten cap. The lower end of the sheet is turned under along the bottom and sides without making any cut for the corner. The top

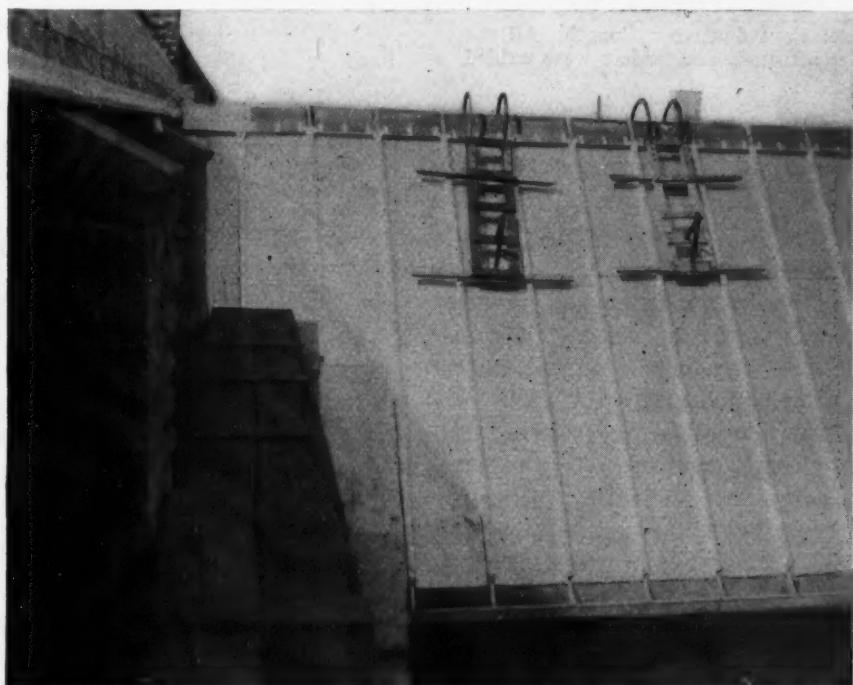
edge is turned into the sheet so that it will hook into the turned under bend of the sheet going above it. The ease with which aluminum can be formed makes it possible and easy to do the forming without cutting and eliminates the soldering which is necessary to get a weather-tight seam in materials which must be cut and soldered at the corners above the seam.

The roof is of a style known as the batten type roof. In this form of roof battens are nailed onto the roofing and run from eave to ridge. The battens were cut from 2 by 2-inch lumber and were cut square. In some recommended types of battens the batten is cut with an under bevel so that the bottom is narrower than the top. This permits the bend of the sheet to take the crosswise expansion without buckling from pressure against the batten.

The roof is insulated with gypsum and this in turn is covered with roofing paper of heavy grade. The purpose of this paper is two-fold; first to protect the more or less fragile gypsum and second to insulate the aluminum from the gypsum. Unless it is insulated any moisture which accumulates between the gypsum and aluminum is likely to set up a chemical action between the gypsum and the aluminum to the danger of the sheet.

The gutter was hung first. This gutter is of small size but has sufficient slope to carry off rapidly all water from the roof. The gutter is of well planned design and a cross section is shown in one of the accompanying drawings.

Two sizes of gutter were used.



The roof sheets on one wing waiting for the ridge. The special ladders were developed by the contractor to use in putting on the ridge. The gutter shows its shape and fastening too



Welding a two-way elbow section to a straight downspout length. All the gutter sections, downspout sections, conductor heads and leaders were welded

A size specified as a 6 by 6-inch gutter serves the main roof, while a smaller size, 5 by 5-inch serves the roof of the buttress and the nave in back of the church. The forming of these gutters necessitated some careful work as shown in the cross section drawing accompanying this article.

The sections of the gutter were left open after they were raised to place and were then welded after the sheets were laid. In this way welding could be done on the seams of the gutter and the seam between the gutter and the lower sheet which was spot welded at the edges and where the hanger went under the sheet. The tanks were carried along the scaffold with enough hose to

make several welds to each move of the tanks. Welding operations on aluminum were done by a welder furnished by the Aluminum Company of America.

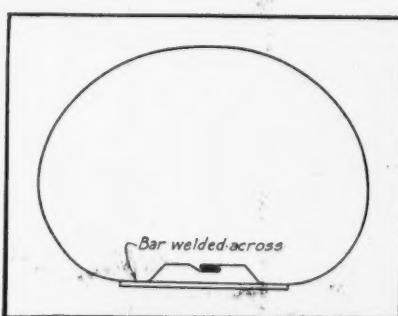
Welding of aluminum requires some degree of skill as the material is very ductile and too hot a flame or too inexpert a welder can cause holes in the material that welding cannot patch. The pictures show these welding operations. While two kinds of gas can be used in welding oxy-hydrogen is most commonly used because the flame is not so intense or hot and because this lower temperature is less likely to cause injury in the operations. The oxy-hydrogen flame when properly adjusted will melt ordinary

gage sheet as rapidly as the operator can work and is recommended for all light weight sheet work.

Aluminum sheets used for roofing have some characteristics which are not common to other materials and should be understood in order that a good job can be done. All aluminum is covered with a thin film of oxide, which is so strong that even though two lumps of aluminum are melted and brought into contact they will not unite unless this film is broken mechanically or removed in some other manner.

In welding aluminum, difficulties due to this oxide film may be overcome by the "puddling" method, which consists merely in mechanically stirring the pool of molten metal, but this has the objection that the films of oxide, though broken up, still remain in the mass of metal. A flux is therefore almost universally used in the autogenous welding of aluminum. It is the duty of this flux to dissolve the oxide as the welding progresses.

A good flux should have the following characteristics. It must have the ability to dissolve oxide very quickly and in such amounts as may be required. The melting point must be below that of the metal and it must not volatilize at the temperature to which it is subjected by the flame. The specific gravity of the molten flux with the oxide dissolved



A cross-section drawing of a downspout. Note the shape and the welded reinforcing bar across the back

in it must be sufficiently less than that of molten aluminum so that it will quickly rise to the surface and thus carry the oxide out of the weld. Furthermore, the flux must not deteriorate when kept in storage.

A common method of using flux is to dissolve it in water to the consistency of a thin cream and either apply it to the joint by means of a brush or dip the welding stick into the mixture. Sufficient flux will cling to the welding stick to supply the required amount as needed.

Aluminum welding fluxes, when permitted to remain on the metal and then subjected to moisture, will attack aluminum. It is, therefore, necessary to completely remove the flux and this should be done immediately after welding has been finished. This is done by washing the weld with clean water.

The manipulation of the torch requires considerable skill and the Aluminum Company of America has recognized this and established schools where any contractor may send one of his men to take a course in welding aluminum. One of the contractor's men took the course for shop use.

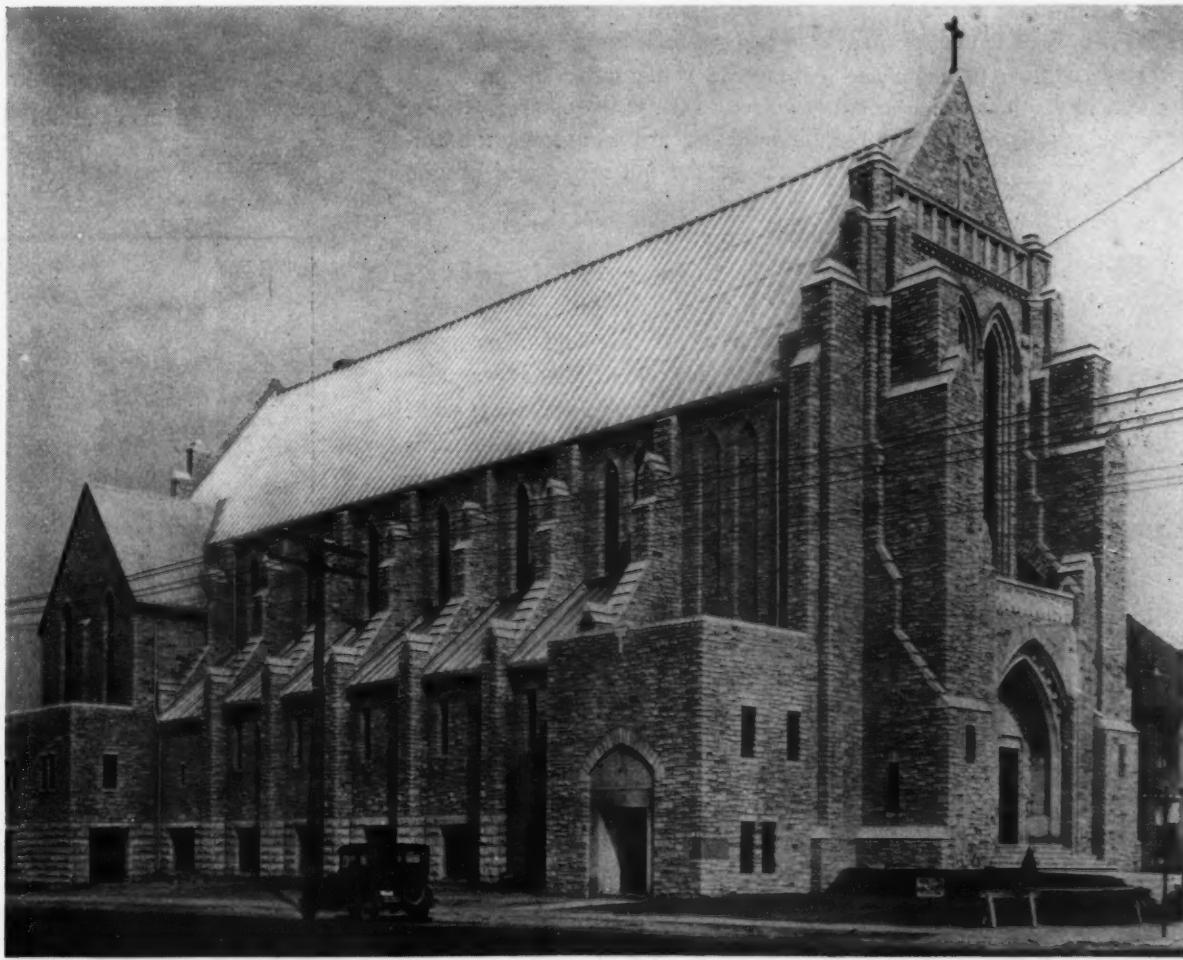
While the welding is going on the torch is never directed forward as the flame can blow molten metal ahead of the actual welding point where welding of the sides of the joint has not yet occurred with the result that only a glued joint is made and this is not strong.

In good welding both sides of the joint are heated and melted simultaneously. If the sections to be joined are of unequal thickness the flame has to be directed more against the heavier part. One of the things impressed on the welder is that greater speed is necessary in order that holes are not burned. Another thing is that as the welding on one seam progresses the whole mass heats up with the result that the welder has to push his seam faster than he usually does on other metals. When a seam is started it should be pushed through until it is completed. If the seam is so long that this cannot be done,

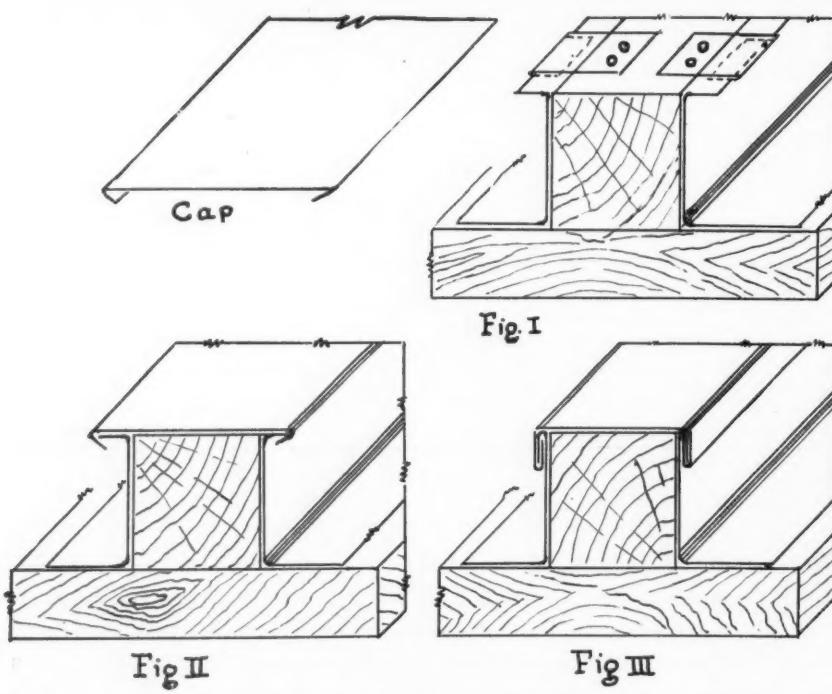
then the seam should be tack-welded at intervals. While this may cause local buckles, if the tacking is not done the warping due to expansion and contraction in heating and cooling will become cumulative and may crack the parts already welded.

These recommendations for welding were closely followed on the church. The roof sheets, of course, were not welded, but the gutter sections were, also the conductor heads, the downspouts and the joint between downspout and gutter when not through a head.

The conductor heads were worked out with an eye to beauty and the easy manipulation of the aluminum. A cross section of one of heads is shown. This is a cross section of the front piece, but the outline was also used for the two ends. Several sizes were used depending on the location of the downspout. On the building there are 18 conductors from the upper roof and an equal



This is the finished roof. Metal roofing makes a splendid material for such steep roofs. The color and sheen of the aluminum harmonize with the color of the stone work



These drawings show how the sheets were formed and how the cap was locked into position. This design requires three pieces for a lock, but requires fewer forming operations in the shop

number from the buttress roof to the ground.

The first plan made for the conductors used a rectangular section, but this was redrawn to make use of an elliptical section which conformed more readily with the cor-

ners down which the conductors were run. A drawing of this section is shown and the method of welding a back brace indicated. This brace like the other operations is welded rather than soldered. These conductors are run down the corners of the buttresses and are inconspicuous except for the color of the aluminum.

The roofing sheets, of course, are not welded. The lock cross seam is similar to that used on other materials. The top of the lower sheet bends into and over the sheet while the bottom of the sheet above turns under and back. The sheets are slipped into place between the battens and shoved up until the seam is locked. A wooden block cut the width of the seam is placed on the seam and the two sheets hammered into a tight seam.

The batten cap used on the roof is somewhat less than 3 inches wide and was formed with two bent under edges. The cap is slipped over the sheets in two adjoining spaces between battens and the cap and sheet bent back against the batten strip with a special plier. A block is then placed against the seam and the seam pounded flat against the



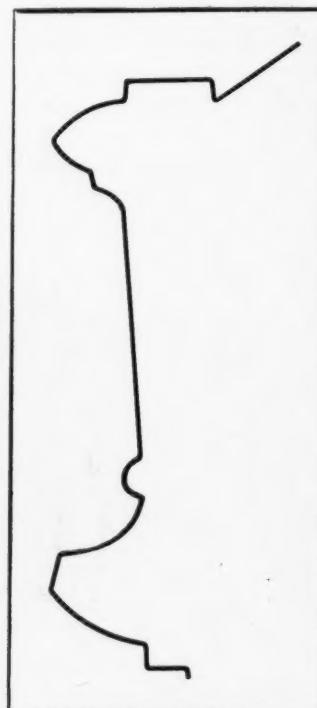
A closer view of the ridge working ladder. The top steel frame holds a ladder on each side of the roof

batten. When the seam is kept far enough from the surface of the sheet to prevent capillary movement of water moisture cannot penetrate the seam.

The sheets when placed between the battens are clipped along the two edges by a clip which is nailed to the top of the batten. The clip fits around the bent edge of the sheet and chett, clip and batten cap are turned when the cap is locked. These clips are also put along the top of the sheet to hold it in position and take the down pull off the sheet above. Here again the two sheets and the clip are turned when the seam is locked. Two clips were usually put along the top of the sheet.

The same construction was used on the sheets of the buttress roof and the nave in the rear.

All the roofing material was of 20 gauge. In the whole job there is some 20,000 square feet of roofing and a large amount of aluminum in the gutters and conductors. The sheets as received varied in width according to the kind of unit they were to be made into and the weight also varied according to the work.



A cross-section of the front panel of a conductor head. Their intricate design was readily worked in aluminum

# Right Now Is the Time To Take Advantage of the Growing Popularity of Oil Burners

MORE and more the warm air heating man is being pulled into the field of oil burner installation and servicing. One reason for this is the fact that in past years the oil burner representative was a salesman and not a heating man. Another reason is the fact that after a burner is sold it has to be made to operate and has to be serviced. If the heating plant is not efficient for hard fuel it will not be efficient for oil. The result is that someone who knows heating must put the plant in workable condition before the burner sale can be called a success.

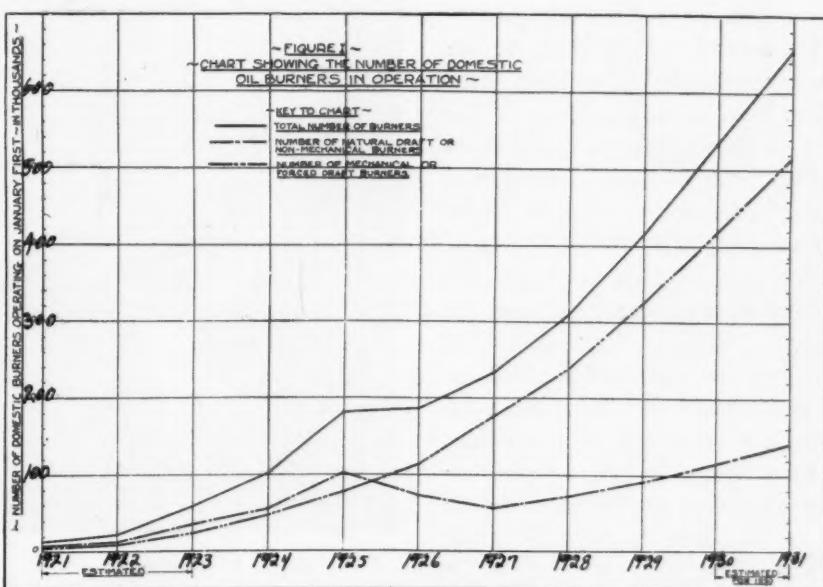
The growth of the oil burner industry has been one of the sales wonders of the past five years. It is still going ahead at a tremendous rate. Most of us don't realize just how large this growth has been. The American Oil Burner Association has just made a survey of the industry and now issues some figures which are worth looking over.

In 1921 only 12,500 homes in the United States were heated by oil

burners. Today the number is 535,000, and at the present rate of increase there will be 655,000 domestic oil burners in use in 1931.

The figures are taken from a re-

The strides made by this industry in the domestic heating field is further demonstrated by the fact that since 1921 the annual consumption of fuel oil in American homes



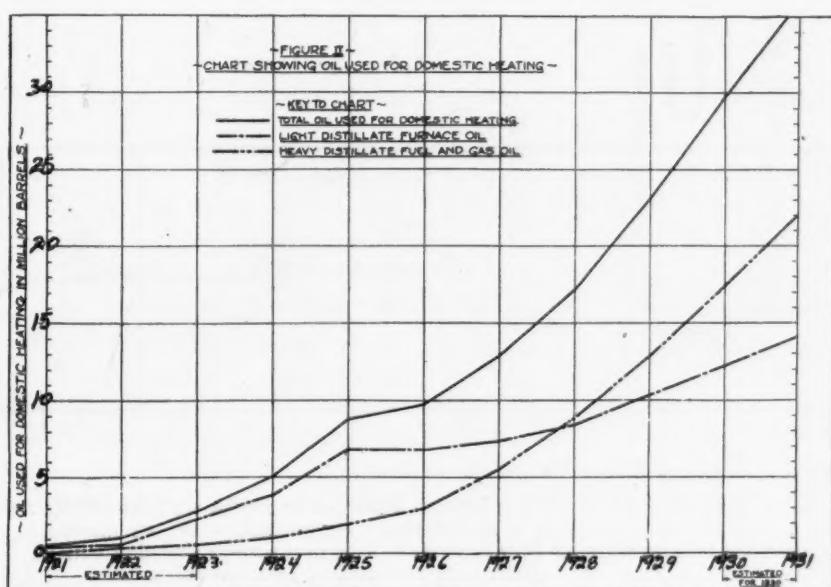
port just issued by the American Oil Burner Association, based upon data of the U. S. Bureau of Mines, the Census Bureau and other sources.

has increased from 600,000 barrels to 29,790,000 barrels or 1,250,000,000 gallons.

Illinois, where oil burners received their first important public test under the boilers of the Columbian Exposition in 1893, still leads the country in the number of domestic burners in use today. More than 131,000, or 24.50 per cent of all the domestic burners in the United States, are warming homes in that state.

New York is the only state that approaches this number with 19.20 per cent or approximately 103,000 burners. Together the two states have almost as many oil burners as the rest of the country combined. Pennsylvania and Massachusetts rank third and fourth nationally with 6.58 and 6.34 per cent respec-

(Continued on page 50)



# FAN FUNDAMENTALS [Part IV]

## With Particular Reference to the Use of Fans in Heating

Whether we consider the quick passage of a few cubic feet of air through the piping system of a warm air heating plant or turn our attention to the movement of a storm area across the country occupying several days of time, we are dealing with the same basic principle; namely, that air flow is due to a pressure difference—air flows always from an area or position of higher pressure to one of lower pressure.

When it is free to move, the greater the pressure difference, the faster it moves. This is why a rapidly falling barometer which indicates rapidly decreasing air pressure, is a warning of high winds.

In a warm air heating plant or any other duct system, however, air is never perfectly free to move. There is always the retarding effect of friction of the air against the inner surfaces of the ducts. Consequently, a part of the pressure difference which causes air flow, is "used up" in overcoming this friction. This part of the total available pressure is therefore called *friction pressure* or more commonly, *static pressure*. The remainder of the total available pres-

By G. A. VOORHEES  
*Heating and Ventilating Engineer,  
Indianapolis, Ind.*



G. A. Voorhees

sure is called *velocity pressure* because it is that component of the total pressure which exerts itself to produce velocity of flow.

(Total pressure) = (Velocity pressure) + (Static Pressure).

This formula is important because it states the fundamental relation between the *only* pressures that have anything to do with the movement of air through ducts.

From the formula it is evident that for a given available pressure (total pressure), as the frictional resistance (static pressure) increases, the velocity of air flow diminishes. Thus static pressure is a highly important item in all air duct systems because of its direct bearing on the velocity of flow and consequently on the volume of air handled in a given time.

Sometimes the furnace man is confused by various other pressures and "heads" which he hears mentioned, but this confusion can be avoided by bearing in mind that the terms "static pressure," "static head," "friction pressure," "friction head" and "maintained resistance" all mean the same.

The terms "velocity pressure" and "velocity head" are merely two different names for the other component of the total available pressure.

"Total pressure" is also met under the names "total head," "dynamic pressure," "dynamic head"

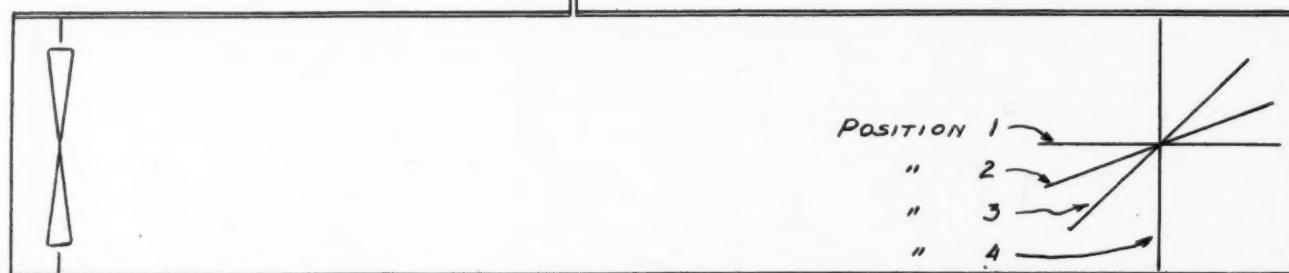


FIG. 1

This drawing illustrates the meaning of "static pressure." If we place a fan and a damper in a tube we have all the factors which effect static pressure. If the damper is full open there is no resistance except that of the air moving along the pipe surface. As the damper is closed the resistance to air flow increases. This is the same situation which exists when the pipes of a heating plant, the furnace and the registers are too small or have too many turns

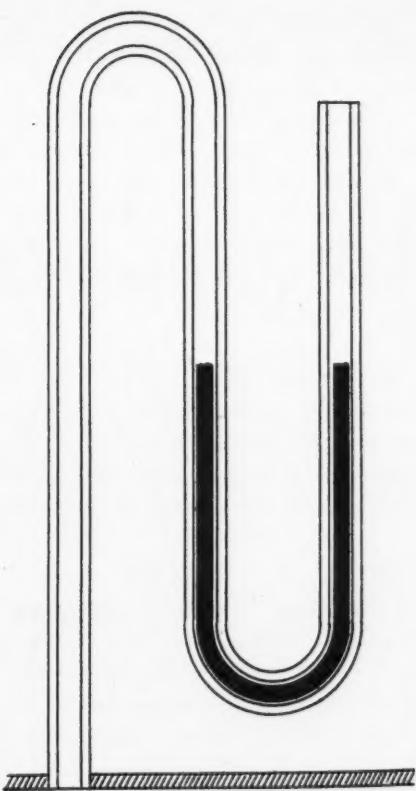


Figure 2A. When a fan is not running the pressure inside and outside the system are the same. The water in the two arms are at the same level

and "motive head."

The term static pressure occurs so often in connection with furnace fan systems that a clear understanding of its meaning is desirable.

Consider a section of pipe (Fig. 1) equipped with a U-tube containing water as shown in detail in Fig. 2, a damper at one end of the pipe and at the other end, a fan of the pressure type—that is, one so installed that there is no air passage around the sides of the propeller to permit backward leakage of air from the discharge side to the suction side of the fan.

Let the setting of the damper represent the frictional resistance which the fan must overcome in driving air through an actual warm air heating plant. Position 1 of the damper represents the ideal and wholly impossible condition of *no* frictional resistance whatever and position 4 represents a condition equally impossible when the plant is operating; namely, a frictional resistance so great that no air at all would flow. This latter condition could exist if every register were

tightly closed but the plant in that case would not be operating.

When the fan is not running, the air pressure inside and outside of the pipe is the same and since the U-tube (Fig. 2a) is open to the atmosphere, the level of the water is the same in each arm of the tube.

If we assume for the sake of illustration, a condition that is not strictly true, namely, that in this relatively short pipe, there will be no frictional resistance with the fan running and the damper wide open, there would be no obstruction to air flow and the water would still maintain the same level in the gauge.

If the damper is now set in position 2, it obstructs somewhat the free flow of air and the volume delivered at the pipe outlet is therefore less than was delivered with the damper in position 1. This obstruction to free flow caused by the damper in position 2 has, in addition to reducing the volume of air flowing through the pipe, resulted in a slight compression of the air within the pipe between the fan and

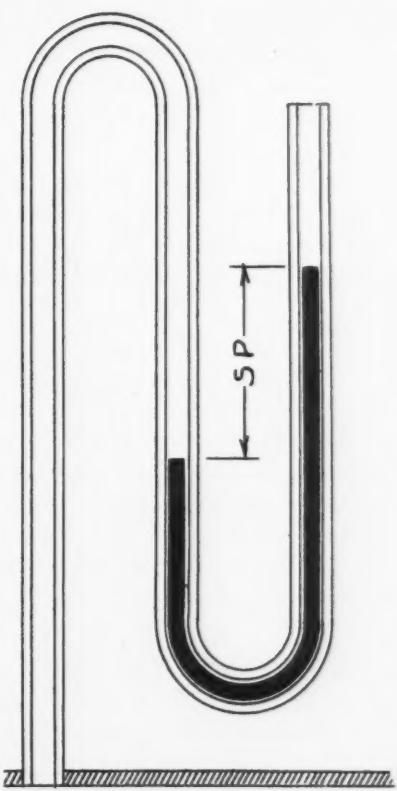


Figure 2C. If we put the damper in position 3 or have a system with more than average resistance the inside pressure increases still more and the difference in water level becomes more pronounced

the damper. This is shown as would be expected, by the water in the gauge assuming the level indicated in Fig. 2b.

When the damper is further closed to position 3, the volume of air forced through the pipe past the resistance represented by the damper, is still further reduced and the air inside the pipe still further compressed as shown by the increased difference of water level in the gauge (Fig. 2c).

In the extreme condition represented by damper position 4, the total pressure exerted by the fan is static pressure. There is no velocity pressure because (assuming that the damper is tight) there is no velocity of flow *through* the pipe and consequently no pressure producing such velocity.

In any case the basic formula given before, holds true. With the damper wide open in position 1 and (as assumed) no frictional resistance to retard air flow, the total pressure imparted to the air by the fan was utilized in producing ve-

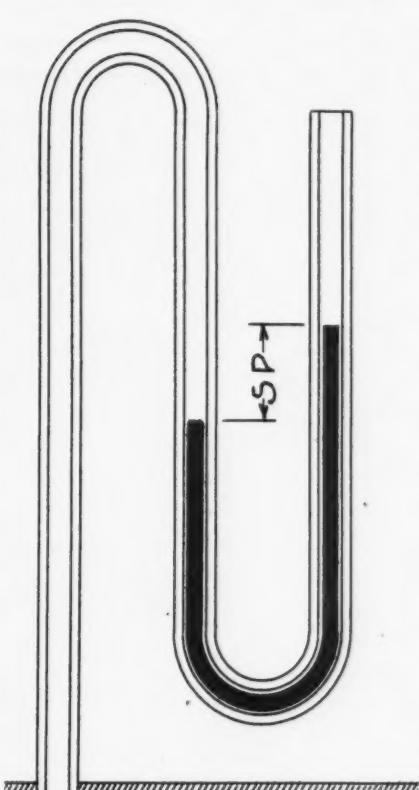


Figure 2B. As the damper in the pipe illustration is partly closed, the system has average friction pressure inside the pipe risers. This shows itself by a difference in level in the U-tube

lacity of flow. The static pressure was zero because there was no resistance and the formula becomes:

(Total pressure) = (Velocity pressure) + 0.

With the damper tightly closed there was no velocity pressure and the formula becomes:

(Total pressure) = 0 + (Static pressure).

The U-tube of the type shown in Fig. 2 indicates or measures, by the difference of water level, the magnitude of the static pressure and this pressure is usually spoken of as "water gauge pressure." Thus when a fan manufacturer rates the capacity of a given fan "1200 C.F.M. at  $\frac{1}{4}$ " S.P." it means that if this fan were installed in the pipe shown in Fig. 1 and the damper so adjusted that the difference in level of the water in the U-tube is  $\frac{1}{4}$ ", the fan should deliver 1200 cubic feet of air per minute through the pipe in spite of the frictional resistance caused by the damper. The initials S.P. in the above rating mean "static pressure." The expression " $\frac{1}{4}$ " W.G." means the same, W.G. standing for "water gauge."

The importance of static pressure in choosing a furnace fan is illustrated by the following data taken from the catalog of a fan manufacturer. The data refers to a 14-inch propeller type fan having fifteen blades and running at 1150 revolutions per minute:

C.F.M.	
Free delivery capacity.....	3100
Capacity against $\frac{1}{8}$ " static pressure .....	2150
Capacity against $\frac{1}{4}$ " static pressure .....	1265

Assuming that the manufacturer's ratings are correct, this fan delivering air against a maintained resistance (static pressure) of  $\frac{1}{8}$ " water gauge, has its capacity reduced to 2150 C.F.M. which is  $2150 \div 3100 = 69$  per cent of its free air capacity. At  $\frac{1}{4}$ " static pressure its capacity is  $1265 \div 3100 = 41$  per cent of its free air capacity.

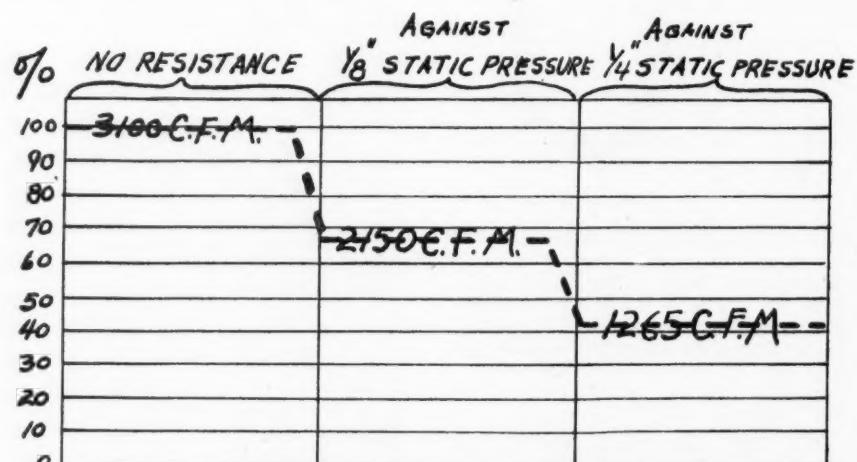
This illustrates the vital importance, in the case of pressure type

furnace fans, of disregarding the free delivery capacity and insisting that the manufacturer give a correct capacity rating of the fan based on the frictional resistance which will be encountered in the heating plant where the fan will be installed.

In a very common type of furnace fan system such as is used in residences and other buildings of moderate size, where the plant operates a part of the time by gravity circulation and part time as a forced air system with the fan running, the static pressure will seldom exceed  $\frac{1}{8}$ " water gauge if the pipes

that the ratings of many propeller fans are nothing more than the merest guesswork. Professor A. I. Brown of Ohio State University, in a paper on the testing of propeller fans presented at the 36th annual meeting of the American Society of Heating and Ventilating Engineers, says regarding the ratings of these fans:

"A little study of these ratings will show some interesting comparisons and some gross errors or exaggerated claims, based, no doubt, upon the results of inaccurate methods of air measurements, and in a



Here is a graphic illustration showing the difference between "Free Delivery Capacity," capacity against  $\frac{1}{8}$ -inch static pressure and against  $\frac{1}{4}$ -inch static pressure. If you need a certain volume of air through the system be sure you get a fan large enough to give this volume against your calculated resistance and not one rated on "free delivery capacity"

are anywhere near Standard Code size. Even with pipes  $33\frac{1}{3}$  per cent smaller than Standard Code areas, the static pressure will seldom exceed  $\frac{1}{4}$ " W.G. Thus if the fan capacity is guaranteed by the manufacturer for static pressures of  $\frac{1}{8}$ " and  $\frac{1}{4}$ ", the data will usually be sufficient.

In the case of straight fan systems, where the pipes are made small and the air handled at a correspondingly high velocity and where the fan runs continually, it is best to refer the plan to the engineering department of the fan manufacturer. In the case of manufacturers of fans who do not maintain such a department or in any case of doubt, the plan should be referred to the manufacturer of the furnace that is to be used.

It should also be borne in mind

few cases with no apparent basis other than that Manufacturer A believes his fan to be superior to that of Manufacturer B and therefore feels justified in publishing ratings which are somewhat more optimistic."

Free delivery capacity is the only capacity rating of booster fans because these fans cannot build up an air pressure within the system. This does not mean that booster fans are useless in the warm air plant, but merely that they will not and cannot change a gravity system into a forced air system. Only a pressure type of furnace fan can do that. But the booster type, used with judgment by an experienced heating man, will accomplish some rather surprising results when applied to a warm air heating plant to which it happens to be adapted.

# Thermostats, Ducts, a Fan and the Old Gas Furnace Make A Remodeled Gas Heating System

THE 1930 heating man who is taking advantage of all the new developments in heating has little excuse for not getting all the replacement work the people in his community can afford.

The obvious reason for this is that the 1930 heating man has so many improvements to sell that if he wants to, he can make almost any heating plant appear obsolete. And this can be done even when the old plant is functioning as perfectly as it did the day it was installed.

But when the heating man runs into a plant which is not working 100 per cent, then it is up to him to sell more than another replace-

ment. He should, then, sell a system which has in it every improvement at hand today.

This is the sales system B. L. Schwartz of Pittsburgh follows. We reported one of his jobs a short time ago, but here is one which shows the type of system which can be sold when the heating man really sells 1930 heating.

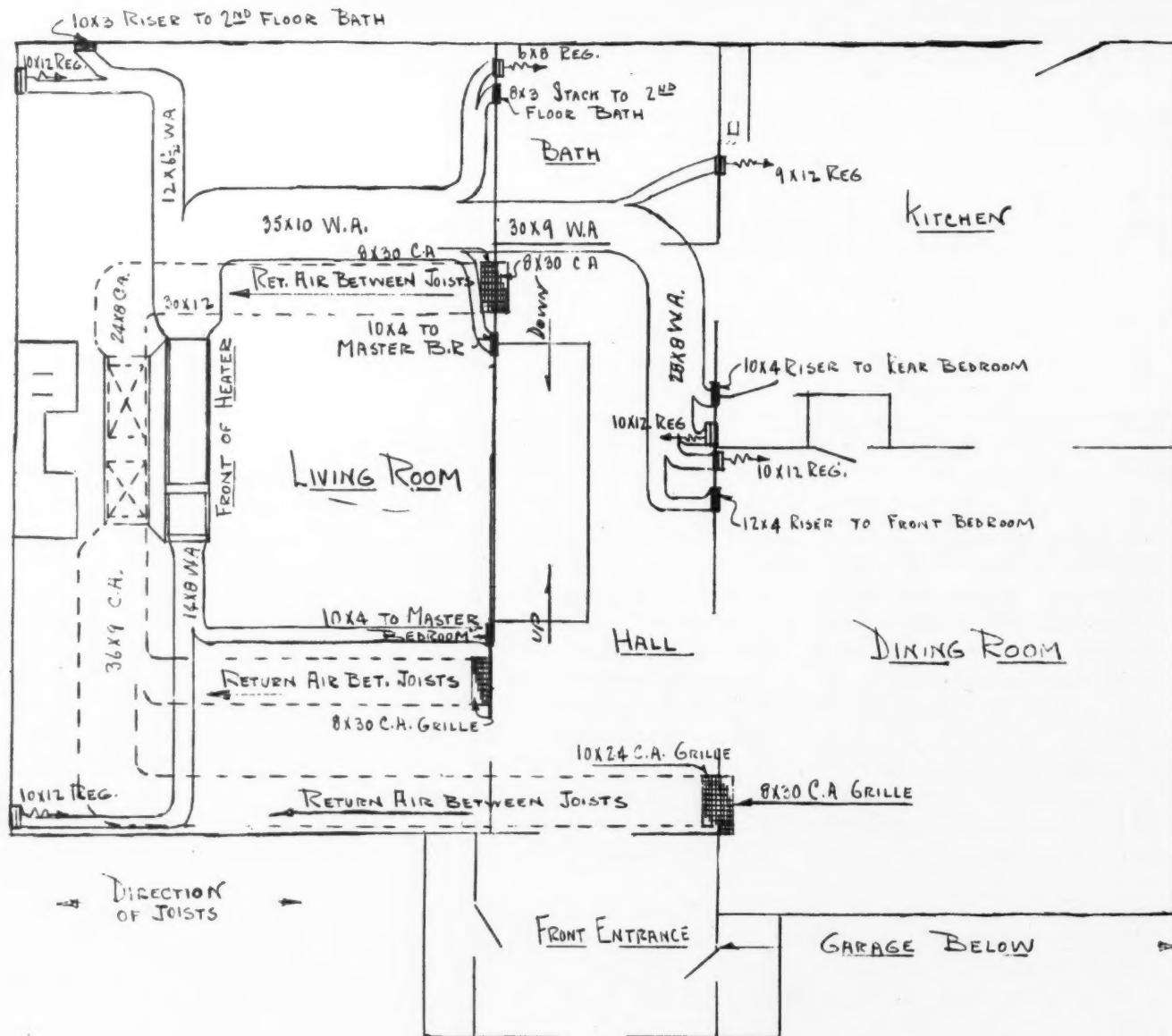
The home where this particular installation was put in is in Sewickley, Pennsylvania. The house is a large frame structure with a shingled exterior and lots of glass area. That it was built some years ago can be seen by the basement photograph which shows rough timber supports under the first floor

joists.

The heating plant consisted of a Bryant No. 50L gas furnace operating by gravity. The owner thought he could improve the system so he had a local tinker place a booster fan in each of the return air shoes. The idea was that the fan would force warmed air through pipes and stacks and circulate all through the large rooms. But the fan was not powerful enough. The system was too large for any but a true pressure fan to get up a positive pressure within the system. The final result was that the altered system did not work any better than the gravity and the owner was dissatisfied.



This large, frame house used a gas furnace connected into a gravity system. Most of the rooms were under-heated. By putting in thermostat control, a pressure fan and flat ducts in the basement the system was brought up to date, changed into a forced air system and uniform heat in all the rooms was obtained.



Here is the layout for the heating system. The furnace was moved over to one side, flat ducts were substituted and a fan forces the air throughout the house. The first thing the Schwartz company did was to revamp and balance the return air side of the plant

Then Mr. Schwartz got on the job and explained what a true forced air system was and what was required to change the old system over into this type of heating plant. The Bryant was large enough and was in excellent condition, so it was not removed. All the round pipes through the basement were taken out and flat ducts were substituted. Then the return air system was changed to bring all the return air into one large housing where a pressure fan forced it into the house. The stacks had been designed for gravity so they were not touched. The use of dampers placed all through the system enabled the engineers to

balance the system to overcome the larger than necessary stacks. In addition the areas of the first floor pipes were reduced when the ducts were placed so that the first and second floor were pretty well balanced.

Under the old system the owner was able to heat the living room and hall which were directly over the furnace, but the rest of the rooms on the first floor and those on the second were cold on days when the temperature was down. In addition, the heating of several of the individual rooms was spotty with cold corners and cold floors. The basement, at the same time, was overheated and the more the

furnace was pushed the hotter the basement became. All these habits of the heating plant were just what the owner did not want.

The sale of the new plant was made on three main features. First the owner wanted to modernize his basement so a duct system fitted right in with his desires. He was dissatisfied with the heat supply of the gravity and booster plants and demanded uniform heat in all rooms. The fan system met this requirement. Last he wanted as modern a heating plant as he could get and the combination of gas, fan and duct system with automatic control supplied this.

The first thing Mr. Schwartz did

was to revamp the return air side of the plant. The revamped return air system employs a two-joist duct with galvanized iron across the bottom, but without lining inside the duct. The new layout uses two main return air trunks. These can be seen on the layout.

One of the ducts crosses the basement to the front of the house and runs across the front until it is under the hall dining-room partition. Here it is carried up and con-

two grilles are of the same size—8 by 30-inch. One grille serves the hall where the basement stairs go down, while the other in the living room serves the back half of this large room.

These two main return air ducts are carried into the top of a cold air housing. Between this housing and the furnace is a Miles No. 1500 fan. This unit has a capacity of 2200 C. F. M. In order to insure quietness in the fan, the fan was

furnace is 176,000 B.t.u. so that the plant proper was of ample size. In order that the best heating could be had the job was figured to have four changes of air per hour. At four changes per hour 2045 C. F. M. were required. The fan was adequate to handle this volume.

In order to heat the house with this rapid turnover of air, 871 square inches of leader pipe were necessary. With the furnace capacity 176,000 B.t.u., enough heat was available to enlarge the living room leads from 10-inch pipes to ducts with the equivalent area of 12 inches.

The stacks were not altered. The system has 6 stacks to the second floor and 6 leads to the first floor. The living room has two warm air registers in the outside corners of the room. This puts the warm air into the room at the outside corners and takes the return air out through two grilles along the inside wall.

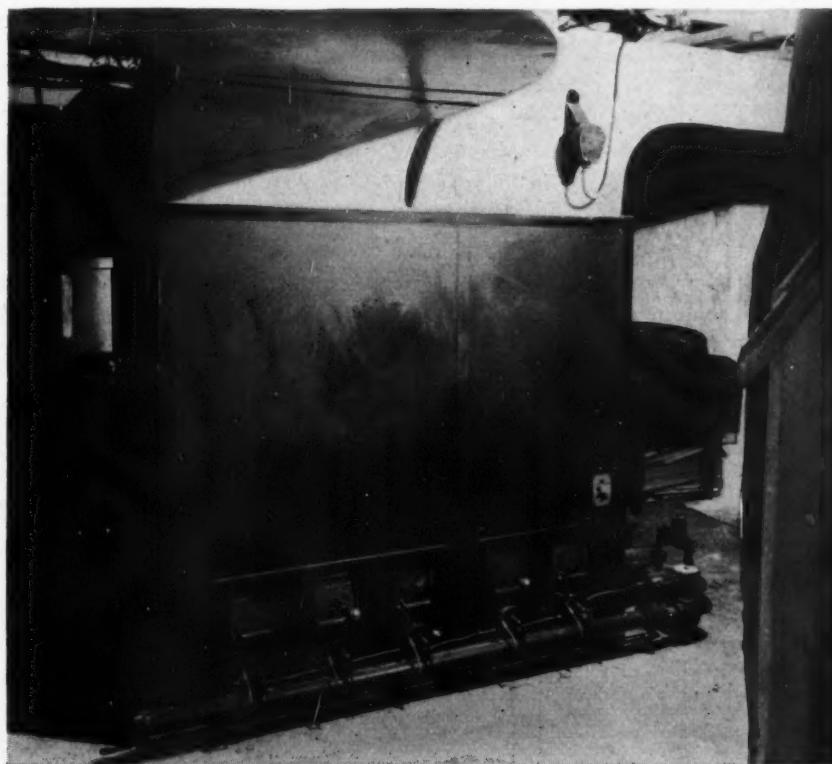
The dining room has its warm air register in the inside corner and the return air grille in the front, inside corner. The kitchen is like the dining room with the faces reversed. The downstairs hall is heated from a lead taken off the dining room duct.

Upstairs there are two smaller bedrooms and one master bedroom. The master bedroom is heated from one outside corner and one inside corner diagonally across the room from each other. The two smaller bedrooms are heated from registers placed in the inside corners. The bathroom, like the bath on the first floor, has one small wall register.

No return air is piped from the second floor, but the location of the first floor return air near the foot of the stairs, coupled with a large open hall on the second floor, provide a direct path from the second floor rooms to the furnace.

One change was made on the furnace. Automatic pilot lights were installed at the owner's request, otherwise the furnace was left as originally installed.

(Continued on page 41)



A closeup of the gas furnace. This is a Bryant 50-L, with five burners. The furnace was not replaced, but the ducts replaced round pipe to the betterment of basement appearance

nected into floor grilles placed back to back across the partition. The larger grille is in the dining room and the smaller in the front of the hall.

This same front duct branches off across the middle of the basement to a grille just inside the hall door of the living room. Placing this grille close to the door opening makes it possible for this duct to assist the hall duct in catching all down-flowing air from the second floor in addition to serving the living room.

The second return air duct crosses the back part of the basement to a double grille face. These

insulated from the floor with two sheets of Celotex. The lower sheet is bolted to the floor. The top sheet is bolted to the fan at other points. The two sheets are then fastened together at still other points. The result is that the fan and floor are joined through separated points of fastening, permitting the fan to move slightly and taking all vibration in the two sheets of Celotex. The housing of the fan was then joined to the cold air box and the furnace boot through the usual canvas collars.

Careful calculations of the house showed that there was 167,351 B.t.u. heat loss. The capacity of the

# AN IRREGULAR T-JOINT

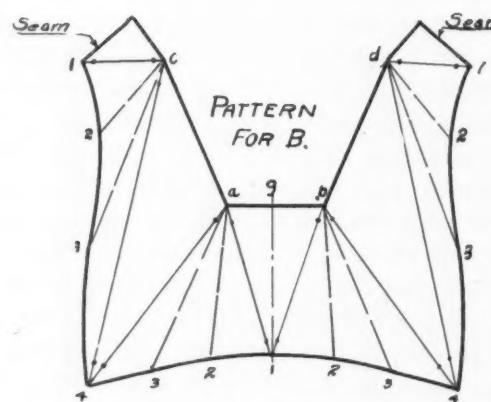
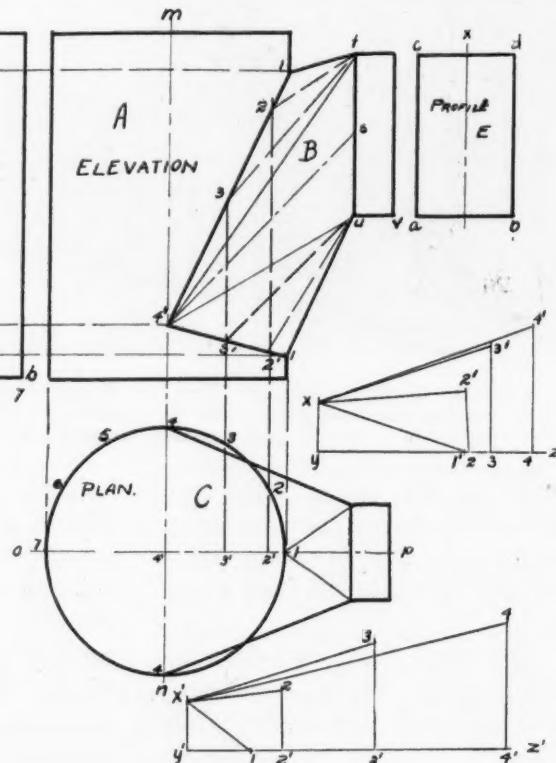
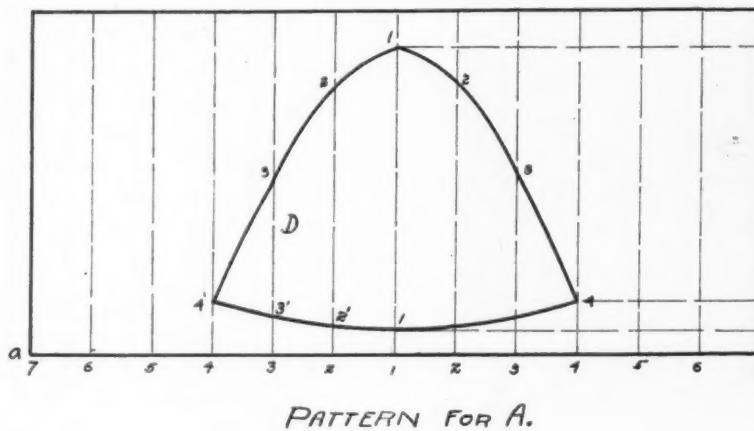
THE accompanying illustration shows an irregular T joint, the prong of which is worked out by the simplified method of triangulation, and part A is developed by the parallel line method. The plan view shown here is not necessary for the development as a half profile divided as we have divided the circle C would be sufficient for the completion of the pattern.

First draw the two horizontal lines representing the top and bottom of the elevation. Draw the vertical center line m-n of an indefinite length. Then draw the horizontal line o-p far enough below the lower horizontal line previously drawn to allow space between the completed plan and elevation as

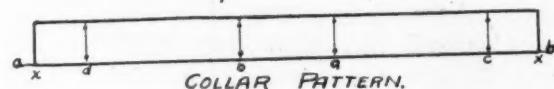
By L. F. HYATT  
*Contributing Editor*

shown. Draw the circle C the diameter of the desired vertical pipe. From the points of intersection of the horizontal center line and the circle draw perpendicular lines intersecting both of the horizontal lines above completing the outline of the rectangle representing the vertical pipe. Next draw the line 4'-S, in this case on a 45 deg. angle. Through point s draw the vertical line t-n equal in length to the desired length of one side of the rectangular opening. On this line draw the rectangle representing the rectangular collar. Locate points 1 and 1' and draw lines connecting t and 1 and t and 1'. Connect

1 and 4' and 1' and 4' as shown in the elevation. Now divide the quarter circle and number the divisions 1, 2, 3, 4 as shown. From these divisions on the plan draw perpendicular lines intersecting the lines previously drawn from 1 to 4' and from 1' to 4'. Number these points as shown. Connect these points of intersection with t and n. Next draw the rectangular opening a-b, c-d, and x which represents the location of the seam which is of course the center of the top. Complete the plan view by dropping lines from u-v on the collar in the elevation through the center line o-p. Step off the distance x to c each side of the center line o-p and draw horizontal lines connecting the two vertical lines just drawn.



IRREGULAR T JOINT.



This completes the rectangle representing the collar. Now draw the lines from the collar to points 4 as shown. This completes the plan and elevation.

It is necessary to find the true length of the lines on B of the elevation. Draw the right angle x y z with the distance x-y equal in length to the distance c-x found on the profile. Now take the distance u to l' found on the elevation and step off this distance from y on the line y-z and number the point 1' as shown, connect points 1' and y. Now take the distance u-2' and step this off on line y-z, locating point 2. Draw a perpendicular line from point 2, and with the dividers set to the distance 2-2' on the plan step off the distance 2-2' on the vertical line just drawn from point 2. Connect the point with x as shown. Continue in a like manner with the other lines up to and including u-4'. Next construct the angle x' y' z'. On the line x'-y' step off the distance c-x on the profile as was done with the triangle x y z. From the elevation take the distance 4'-t and step it off on the line y'-z' and number the point 4'. From point 4' draw a perpendicular line of indefinite length and upon this line step off the distance 4-4' found on the plan. Continue with the other lines of this group exactly as was done with the other group of lines.

It is now necessary to complete the pattern for A before it is possible to obtain a pattern for B. First draw the horizontal line a-b and upon this line step off and number the 12 spaces equal in length to those found on the plan. Draw the perpendicular lines from these points as shown. Draw the upper horizontal line representing the top of pipe A. Now from points 1, 2, 3, 4', 3', 2' and 1' draw horizontal lines on the pattern intersecting vertical lines of the same number and draw the curved line through these points describing the opening D. This completes the pattern for A.

To begin the pattern for B first

draw the horizontal line a-b equal in length to a-b found on the profile E. Next draw the vertical center line g-1 midway between points a and b. On this line step off the distance u-1' found on the elevation, and connect these points as shown. The distance 1 to b and 1 to a could also be taken from x-1 on angle x y z. Next take the distance x-2' from angle xyz and with the two points a and b as centers strike arcs of indefinite length. Now with the distance 1'-2' on patterns A and 1 as a center strike arcs intersecting arcs just drawn and locating points 2. From the angle x y z take the distance x-3' which is the true length of u-3' found on the elevation, and with a and b as centers strike arcs. Then from pattern A take the distance 2'-3' and with points 2 as centers strike arcs intersecting the arcs just drawn and locating point 3 on pattern B. In like manner draw the triangles a-3-4 and b-3-4. Now take the distance x'-4 found on angle x' y' z', which is the true length of the line 4-t found on the elevation, and with points 4 on the pattern as centers strike arcs intersecting the arcs already drawn locating the two points c and d on pattern B. Next take the distance x'-3 and with

c and d as centers strike arcs of indefinite length. From pattern A take the distance 4'-3 as a radius and 4 on pattern B as a center, and strike arcs intersecting the arcs just drawn locating points 3 on the pattern. Continue as before with the other lines up to and including c-1 and d-1, each time taking the distance for the short side of the triangle from the points on the curved line representing the opening of the pattern A. Now with the distance t-1 on the elevation and points 1 as centers strike arcs, and from profile E take the distance c-x and with c and d on the pattern as centers strike arcs intersecting those just drawn, completing the last triangle of the pattern.

Draw the line a-b of the collar pattern and upon this line step off the distances x-c, c-a, a-b, b-d and d-x found on the profile. Draw the perpendiculars showing the bends, also the lines at each end. Step off the distance u-v found on the elevation on the perpendicular lines on each end of the collar pattern and draw the upper horizontal line. Dots on the patterns indicate the bends. Add the necessary allowances for seams, etc., thus completing the patterns.

#### REMODELED GAS SYSTEM

(Continued from page 39)

In order to make the system fully automatic, controls were hooked into the furnace and the fan. The fan always operates when the burners are going. Heat stored in the furnace is taken care of by gravity flow when the burner is off. A Furnacestat placed in the bonnet of the furnace starts the fan when the temperature in the bonnet from such stored up heat reaches 150 degrees. When this stored up heat is forced out of the furnace the fan shuts off. In this way the system makes use of every bit of heat generated.

One of the things Mr. Schwartz has made good use of is the appearance of the duct system.

These ducts are hung up against the basement ceiling where they are out of the way. In addition all the basement ducts are ducoed a dark green color. This gives the basement an appearance like that of a high class yacht engine room and is much appreciated by the owner. It gives him just one more reason for taking friends into the basement "to look at my heating plant. There isn't a better one in town." That sort of owner publicity sells jobs as nothing else can.

That the system is satisfactory is proved by the fact that the owner has repeatedly stated that if he couldn't get another job like this one he wouldn't take \$1,000 for the plant.



## The Duct System for Heat Removal

FROM letters received and talks held there seems to be an erroneous idea that gravity ventilators are only partly successful in connection with duct systems for heat removal.

My answer to this is "Gravity ventilators can be used and with splendid success."

In the first place, let me call your attention to the fact that the "so-called" gravity ventilator is much more than a gravity ventilator. Of course there are all kinds of ventilators and many of them are poorly designed and poorly constructed. There are, however, good ventilators to be bought, and a good ventilator is more than a gravity device; it is a scientifically designed mechanism for using the outside wind currents for the purpose of pumping air out of buildings. The pumping principle used by a ventilator is exactly the same as that used by a suction pump, namely the creation of an area of low pressure at the end of a tube. In the case of a suction pump the tube is a pipe and the medium is water. In the case of a ventilator the tube is a sheet metal pipe or duct and the medium is air.

It is true that many so-called ventilators are not scientifically designed and it is also true that gravity action sometimes causes these poorly designed devices to seem to function. The fact remains that the homemade ventilator or the poorly engineered factory made ventilator is no more efficient than the motorless automobile which succeeds in

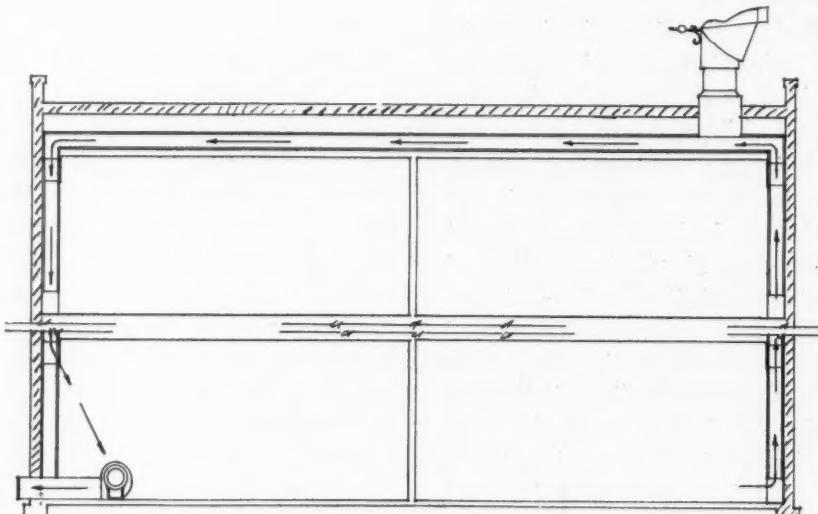
By PAUL R. JORDAN\*

running down hill. The wise contractor realizes that he is not equipped either to design a ventilator scientifically or manufacture it economically, therefore, he uses manufactured ventilators in conjunction with the engineering service the ventilator manufacturer furnishes.

The limitation of the ventilator is due to the fact that it is a low pressure device. This characteristic has its advantages as well as its disadvantages. Low pressure is much easier to handle than high pressure. A high pressure system must be carefully balanced, while a low pressure system will usually balance itself.

A so-called gravity system then, more properly a low pressure system using ventilators, should be used wherever possible in preference to a high pressure system using fans. It is more practical, more durable, and easier to keep in operation; needs less supervision, costs less initially on the basis of results obtained, costs less to operate and costs less to maintain. I can speak without prejudice on the comparison on these two types of systems, as I manufacture fans as well as ventilators.

In laying out a duct system, if it is for heat removal only, the duct openings should be at the ceiling. If, however, the system is to be used for ventilation in winter, there should be doors on the ducts to close



SHOWING FAN OR BLOWER  
FIGHTING VENTILATOR ACTION

Figure 1—Here is a duct system connected into an exhaust ventilator. The vertical ducts have two openings, controlled with movable doors. In winter the openings at the floor are opened and the openings at the ceiling closed. This ventilates the room, but conserves heat, since the ducts carry off the coolest air

\*The Paul R. Jordan Company,  
Indianapolis, Ind.

the ceiling openings and the ducts should be extended to the floor with duct openings at the bottom. By drawing the air from the floor, heat is conserved, and ventilation, while not as active through the floor openings as it is through the ceiling openings, is usually sufficient for winter purposes. Figure 1 shows such a layout.

One thing to look out for is the

the ceiling opening and a door on the floor opening will give the necessary control providing both doors are tight.

The same thing can be accomplished by a door at the ceiling and a damper in the duct at any point below the ceiling door.

Dampers should be in the ducts and not in the ventilators. Dampers in the ventilator bases are advisable

ence you can get, including all you can learn from the plant operators and workmen, all of your own experience, and the engineering knowledge and experience of your ventilator manufacturer.

In general, a minimum for heat removal is 8 changes of air per hour, an average 16 changes, and extreme 24 changes per hour.

As to ventilator capacities, the tables of some manufacturers are misleading in that they give the capacity of their device under the most favorable conditions. The average condition is not favorable. A duct velocity of 300 feet per minute may be used.

Ventilator sizes should be made to conform with the duct capacity. Do not cut down the size of the ventilator beyond the corners of a square flue in your figuring. In other words, if you have a flue 12 inches by 12 inches square, put on it not less than a 12-inch round ventilator. Match 144 square inches of flue area with at least 113 square inches of ventilator area. This gives you an easy formula, namely match up your combined flue areas with ventilator areas inch for inch figuring your rectangular flue areas as they are and figuring your round ventilator areas as if they were square; that is, figure a 12-inch round ventilator as if it had 144 square inches, a 30-inch round ventilator as if it had 900 square inches of ventilator area, etc. If the ducts are round, match them up 100% with ventilator area.

A reduction of ventilator areas by 22% where the ducts are rectangular and the ventilators are round is not uncommon practice, but is not based on engineering accuracy. You often hear the statement that a 12-inch round flue will carry as much air as a 12-inch square flue. That may be true, but we cannot reduce a flue at the top from square to round without cutting down its efficiency.

I ran, on March 11, 1927, a test to determine this point. The test consisted of my usual four, 1-minute runs covering all four of the

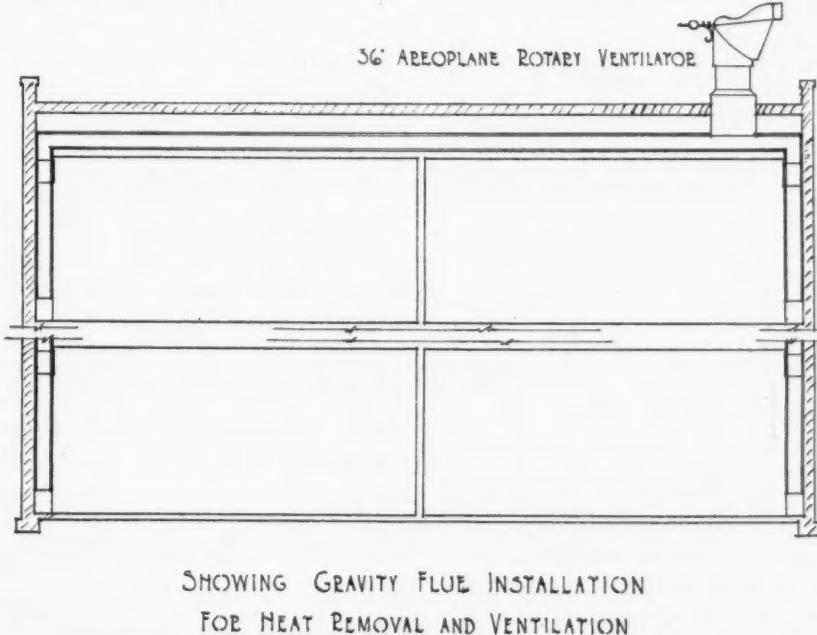


Figure 2—With the duct-ventilator system, all fans in the building have to be watched. As shown here the fan sets up contrary air movements, completely killing the effect of the duct system

presence of fans or blowers of any kind. Even a small blower exhausting air from a tight room, can upset a low pressure ventilating system. If the room is loosely constructed with doors and windows allowing seepage of air into the room from out of doors in sufficient quantity to feed both the blower and the ventilator, then the low pressure ventilation will be a success. In case there is not sufficient intake either through seepage or otherwise to take care of the blower, then you are likely to get a reversal, with a re-circulation of air as shown in Figure 2.

A good rule to follow is to see that every duct is dampered. This gives control of the entire system, enabling the owner to get just what he wants in ventilation, just where he wants it, and when. In the layout shown on Figure 1, a door on

where more than one ventilator is pulling from the same grouping chamber, as for instance where the roof space is being used for a grouping chamber. These dampers in the ventilator bases, however, will not take the place of dampers in the flues because with ventilator dampers closed and flue dampers open, you will tend to get a re-circulation of inside air, up one flue, across the grouping chamber and down another flue.

Another thing to bear in mind is that no duct should be opened onto two different floors. The same duct will on some layouts withdraw air satisfactorily from two or more different rooms on the same floor—but never hook two floors onto one duct.

A word regarding ventilator sizes: in figuring the necessary capacity of any system, bring to bear all of the information and experi-

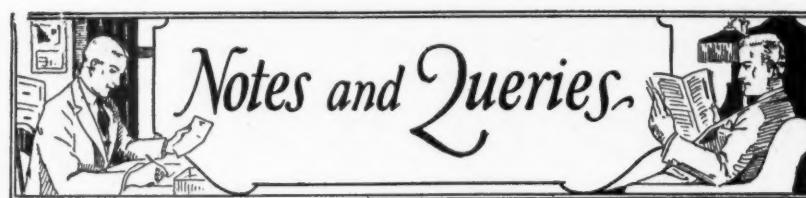
possible combinations of flues, anemometers and flue caps. The flues were my regular test flues, exactly the same height and dimension. I installed a loose square section 12 inches high to cap one of them, and a loose square to round transition section 12 inches high to cap the other one. The two sections were removable and interchangeable. The tabulation of the test is as follows:

North Flue square to round	South Flue square
142	187
181	227
square	square to round
211	189
247	229

You will see by this that the plain square, as you might say, the open corner section, showed the highest run on every combination of flues and anemometers. The totals show 872 for the square section against 741 for the square to round section. A difference of 131 feet or a little better than 15% less for the square to round. This would indicate that ventilators can be matched up inch for inch to within 7% of the combined flue areas economically. Of course the same figures will admit of other interpretations, but will not admit of anything contrary to the fact that at least 78% of the flue area should be matched with ventilator area and that ventilator area beyond this percentage is not uneconomical.

Wherever positive ventilator action is necessary, it is safest to use a Rotary ventilator. Where the ducts are extended to the floor and the lower duct opening is used for winter ventilation, then I would not consider it safe to use anything excepting a good Rotary Ventilator, of standard manufacture and recognized merit.

While it is true that the installation of a duct system demands more careful engineering than the mere installation of a ventilator on an open roof, still a low pressure system with the use of ventilators as the active element, is entirely feasible in most cases. In tall buildings,



#### Automatic Drip Humidifier

From Banner Heating Company, Inc., Youngstown, Ohio.

Will you kindly inform us who manufactures the Automatic Drip Humidifier?

Ans.—Automatic Humidifier Company, Cedar Falls, Iowa.

#### Interlocking Chimney Blocks

From J. F. Jaeckel, P. O. Box 344, Pekin, Ill.

Can you tell me who makes interlocking chimney brick blocks?

Ans.—Holland Chimney Company, Holland, Michigan, and Ullrich Building Block Company, 501 Dietrich Avenue, Hazleton Heights, Hazleton, Pennsylvania.

#### Address of Decatur Furnace and Foundry Company

From Moeller Furnace Company, 114 South 12th Street, Fort Dodge, Ia.

Can you tell us what became of the Decatur Furnace and Foundry Company, formerly of Decatur, Illinois?

Ans.—As far as we have been able to learn, this concern is out of business. However, repair parts for the "Wonder" line may be had from the Northwestern Stove Repair Company, 654 West Roosevelt Road, Chicago.

#### Fire Brick

From E. C. Stocker, 2511 Main Street, Columbia, South Carolina.

I should like the names of firms manufacturing fire brick for furnaces and boilers.

Ans.—Chicago Firebrick Company, 1461 Elston Avenue; W. S. Dickey Clay Manufacturing Company, Kansas City, Missouri; Pilbrico Jointless Fire Brick Company, 1800 Kingsbury, Chicago, Illinois; Rutland Fire Clay Company, Rutland, Vermont, and Williams Stove Lining Company, Taunton, Massachusetts

#### Forming Roll

From A. G. Schroeder, Ironwood, Michigan.

Where can I get a forming roll

that will form a circle about 30 inches in diameter out of  $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$  angle iron?

Ans.—Bertsch and Company, Cambridge City, Indiana; Interstate Machinery Company, 601 West Monroe Street, Chicago, and Jos. T. Ryerson and Son, 2558 West 16th Street, Chicago.

#### "Pfeifer" Clip

From D. Glatt Company, 455 North Artesian Avenue, Chicago.

Can you tell us who in Chicago handles the "Pfeifer" roofing clip?

Ans.—J. L. Perkins, 140 South Dearborn Street. For your information, it is manufactured by William Pfeifer, 475 Greenwich Street, New York City.

#### Lawn or Fish Pond Ornaments

From A. Hardten & Company, 114 Main St., Ottawa, Illinois.

Kindly inform us who makes lawn or fish pond ornaments.

Ans.—Buehler and Jacob, 6022 South Western Avenue, Chicago; Chicago Statuary Manufacturing Company, 401 North Desplaines Street, Chicago; J. W. Fiske Iron Works, 107 Park Place, New York City, and J. L. Mott Company, Trenton, New Jersey.

#### Souvenir Lead Pencils

From H. C. Durham, 1609 Franklin Avenue, Waco, Texas.

Where can I get souvenir lead pencils?

Ans.—Pencil Supply Co., Inc., P. O. Box B, Union City, New Jersey; Souvenir Lead Pencil Co., Cedar Rapids, Iowa.

#### Chimney Draft Gauges

From Haines-Linfesty Company, 1023 Main Street, Klamath Falls, Oregon.

Where can we get chimney draft gauges?

Ans.—Ellison Draft Gauge Co., 214 W. Kinzie St., Chicago, Illinois; E. Vernon Hill Co., 121 N. Clark St., Chicago, Illinois; Hays Corp., Michigan City, Ind.

# RANDOM NOTES AND SKETCHES

Even though our good friend, Roy Walker, may be down in California enjoying a real vacation, he hasn't forgotten his many friends in the furnace industry, as every now and then we get a letter from him asking about the folks back home. While Roy may be heart and soul a furnace man, he enjoys investigating other industries, and if some of our movie directors could read his experiences and comments, the furnace industry would lose one of its most valuable men—it is hard telling where he would shine most, as a scenario writer or comedian.

Roy says he saw Fred Nesbitt the other day and he's fine. That'll be mighty good news for those of you who remember the days when Fred Nesbitt was the life of the furnace meetings, and it took all George Harm's diplomacy to restore peace. But you had to hand it to Fred, he knew what he was talking about—and his bark was many times worse than his bite.

Jim Flavelle, of the Meyer Furnace Company, also was in California recently.

Walker won't be back in this part of the country until October, but says he will be happy to hear from his friends. His present address is 1821 North Argyle, Los Angeles, California.

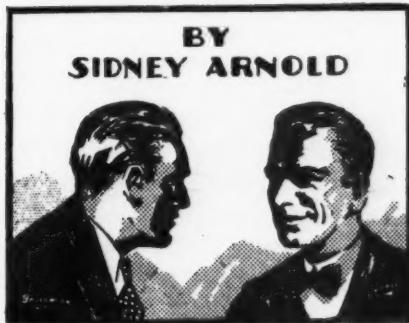
\* \* \*

### Getting High Class

A certain busy sheet metal contractor whose time is worth money has a good method of dealing with barbers. As soon as he is seated in the chair he says: "Cut the whole three short."

"What three, sir?" asks the barber.

"Hair, whiskers and chatter," replies the contractor.



### "Class"

A sheet metal man said to a foreman on a new job: "I'd like to work here, but I can't find a place to park my car."

The foreman replied: "I guess you won't do. This is a high class job, and we want only men who have chauffeurs."

\* \* \*

Just a few days ago I was talking with one of the old-timers. I had asked how business was and he said, "It's not good enough to holler about, but in my time I've seen it worse.

"Take here in my home city. There's a lot of good, hard-working heating men, who play fair with their help and with their competitors. Given fair breaks, they would be considered sound business men. But the way things are here, they can't be good business men and it's a hard job for them to remain honest business men.

"Every time they lay off a man, he goes out and finds somebody fool enough to let him have a couple of furnaces. He goes out and works like a slave and sells them and pockets day wages and nothing more. He doesn't do exceptionally good

work, and if something goes wrong he isn't in business.

"Two things have happened to the high-grade heating men here. One class has abandoned the small competitive job and concentrated on larger, specialized heating installations, such as those using gas furnaces, oil burners, fans, washers, etc. The fly-by-night can't get enough confidence aroused in his ability to land these jobs.

"The other class has begun to organize themselves as sales organizations pushing attachments such as new humidifiers, temperature control and forced air systems.

"The remarkable thing is that both classes have prospered pretty well in spite of conditions. The first class has sold fewer units, but have made longer profits, and the second has sold more units, but in non-competitive markets.

"There's a real problem in business economics in that situation and I'd like to hear from any others who have run across this thing. You run a little item on it and see what happens."

So I'm running the item and waiting.

\* \* \*

### A Copper Salesman Had This Happen

The patter of tiny feet was heard from the head of the stair. Mrs. Smythe raised her hand, warning the members of her bridge club to be silent.

"Hush," she said softly, "the children are going to deliver their good-night message. It always gives me a feeling of reverence to hear them. Listen!"

"Mamma," came the message in a shrill whisper, "Willie found a bedbug."





## ASSOCIATION ACTIVITIES

### Committee of Ten— Coal-Heating Industries, Announces Regional Meetings

The Committee of Ten, Coal and Heating Industries announces immediate plans whereby dinner meetings will be held during the month of August at the following points: Cincinnati, Ohio, Peoria, Illinois, Scranton, Pa., Racine, Wisconsin, and Minneapolis, Minn., to set forth the aims and objects of the parent organization.

The objects of the meetings will be to acquaint the coal and heating industries with the interlocking business relations and the providing of better service to the public. In so far as possible the inaugural series of meetings will be restricted to cities where the coal and heating industries have affiliated through their national associations co-operating in this movement.

The meetings will be organized by National representatives and invitations issued to every individual merchant, or contractor engaged in these lines, regardless of membership in any National Organization.

At the meeting Monday, a movement was inaugurated to assemble all available data on apparatus which will burn solid fuels smokelessly. As an initial service, all information available on flue construction is to be assembled for compilation and future distribution through architects, and the construction industry.

Any communication relative to the work of the Committee of Ten is to be directed to the Secretary of the Committee of Ten, Lorin W. Smith, Jr., Box No. 479, Goshen, Indiana. Among the various committees giving reports, the Ways and Means Committee announced that the work of the Committee of Ten had already been financed for

the first six months period by the Industries participating.

In addition to the regular Committee, representatives of the American Farm Bureau Federation appeared and detailed their Home Modernization program as it would tie in with the general coal and heating industries. They are to take up this activity individually with each of the industries participating in the Committee of Ten movement. A representative of the Committee of Ten is to appear on the program at the annual meeting in Boston of the American Farm Bureau Federation this fall.

At the National Coal Association's annual meeting in Detroit, Mr. E. B. Langenberg, Vice Chairman of the Committee of Ten will appear before the Coal Industry to elaborate on the activities of the Committee of Ten to the Coal Operators.

### Illinois and National Sheet Metal Men Arrange for 1931 Meeting

Officers and Directors of the Sheet Metal Contractors Association of Illinois, held a meeting with the National Convention Committee of the Chicago Association on July 15, at the Chicago Association rooms, Chicago, Illinois.

The object of the meeting to set the date for the National Convention as well as the Illinois State Commission since both meetings are to be held in Chicago.

It was decided to have a one day State Convention followed by a three-day National Convention.

The State Convention will be held on May 12, and the National Convention, May 13-14-15, 1931.

Illinois will have two District meetings. The meetings for the Central and Southern District will

be held at either Springfield or Peoria, and the National District at Chicago. The dates for both meetings will be announced later.

The meeting adjourned at 4:30 P. M. and at 6:30 P. M. the State Officers and Directors were taken to the Manhattan Club, where the Chicago boys had arranged for a wonderful dinner and entertainment. A number of short talks were enjoyed from R. J. Jobst, Peter Beigler, Paul Biersach, Mr. Olsen and others.

Chicago has some wonderful talent, and the entertainment they put on was excellent. The feature number on the program was a number of vocal selections by the Sheet Metal Trio of Chicago.

### Columbus to Be Next Convention City for Ohio Sheet Metal Contractors

Columbus is to be the place of the next convention of the Ohio Sheet Metal Contractors' Association, according to announcement of J. M. Sounders, Cleveland, state secretary. This decision was reached at a recent meeting of the Board of Directors of the Ohio association held in Columbus.

A progressive step was taken by the Board when it voted to have the Board of Directors handle state conventions assisted by the local committee. This plan will make it possible for more cities of the state to invite the convention and relieve the timidity because they have feared their inability to raise the funds to entertain a state convention. Of interest also is the action of the Board in appointing a budget committee from its number to meet with the local committee and to arrange for convention expenditures. The convention will be held sometime in February.

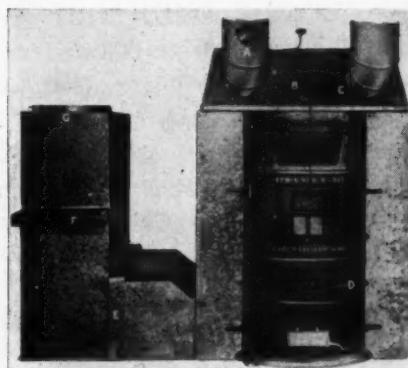
## NEW ITEMS and NEWS ITEMS From and about the Manufacturers and Jobbers

### May-Fiebeger Co. Introduces Ath-A-Nor Air Conditioning Unit

The May-Fiebeger Company, Newark, Ohio, has ready for market a new air conditioning unit built around their Ath-A-Nor furnace.

The new unit is a square cased, all-in-one unit using a Miles fan for constant and forced circulation. Reed air filters for clean return air, automatic drip humidifier, Furnacestat or automatic control of the fan and Minneapolis temperature regulator for automatic control of the furnace.

This unit besides being attractive looking will permit the furnishing of clean air, moist air and warm air constantly to the user.



It also is intended to use rectangular and trunk line both for the warm air and the return air, the cold air returns being returned over the ceiling, dropping in over the Reed air filter.

The company also has ready for delivery a brand new Akron air blast. The Akron Air Blast Furnace has been on the market since 1850. The furnace has always been known as a plant having a large heating surface or ratio of heating surface to grate area.

The company is now waiting for measurements of this unit direct

from the University of Illinois and will then publish the final data.

This new Akron air blast unit incorporates all modern features, with a two-piece firepot, feed door attached to the feed section rather than to the front. Air blast of all cast iron. Coming to the front rather than the rear as in the old style, is a powerful nine tube radiator, full front with water pan in the top of the front.

May-Fiebeger is now distributing a brand new catalog showing their complete line.

### Hart and Cooley Mfg. Co. Inaugurate a New System for Improving Service

The Hart and Cooley Manufacturing Company, Chicago, has just put into effect a system which the company believes will result in a service which cannot be surpassed for a company making as extensive a line as theirs.

The company's catalog lists 2866 regular items in the line (not including any special items such as solid bronze faces, special finishes, etc.) which customers expect to be furnished promptly. Naturally it is an impossibility to keep as many items as this always in stock for any possible order which may be received. What the company has done is simply to make it possible for customers when ordering to tell by a glance at the catalog what items they can confidently expect to have furnished immediately from stock.

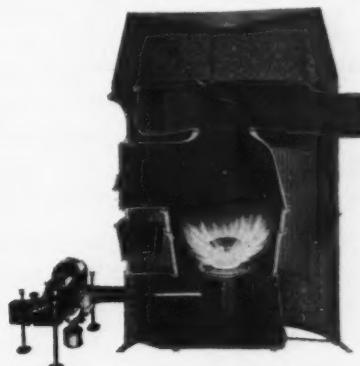
In the catalog are shown in bold face type 1081 items, including the types and finishes which are popular over the entire country, carried in stock for immediate shipment. When it is essential that a register order be shipped the same day it is received, the customer can get this service by ordering a stock item.

When orders are received, they are divided into a group of stock item orders and a group of non-stock item orders and when acknowledgment copy of the order goes to the customer, if the order calls for all stock items the acknowledgment is stamped, "The items on this order are shown in our catalog as stock items and immediate shipment may be expected."

Where a customer's order calls for or contains items shown in the catalog as non-stock items, the company follows up acknowledgment of the order in a day or two by a postal card advising when shipment will go forward and by means of a footnote calls attention to the fact that the items on the order are non-stock items. The company hopes to educate customers in this way to purchase the stock items as much as possible so that orders can be handled without delay.

### Bock Oil Burner Corp., Making Special Oil Burning Furnace

The Bock Oil Burner Corporation, Madison, Wis., is now marketing a specially designed



oil burning furnace. This furnace was designed with the difficulties of burning oil in furnaces in mind. The engineers for the corporation began with the understanding that an oil burner in

an average warm air furnace does not adapt itself readily to the changed conditions. Unless special provision is made the intense heat from the burner results in a large number of expansions and contractions. Also with some types when the burner is on there is a slight reversal of pressure switching from an exterior pressure to an internal pressure.

With these fundamentals in mind the Bock Junior, or model Y, has been developed on a high and low flame principle. The flame on high is not as intense as that of the gun type but is rather a soft lazy fire, circular in shape, heating the castings uniformly.

After sufficient heat is in the living quarters the thermostat causes the machine to drop to low fire, which is just sufficient to prevent cooling the castings and yet not enough to create additional heat.

The change from low to high is very gradual, requiring about five minutes in each case, with the result that the draft is always maintained and the furnace is under a slight vacuum, preventing leakage through the joints.

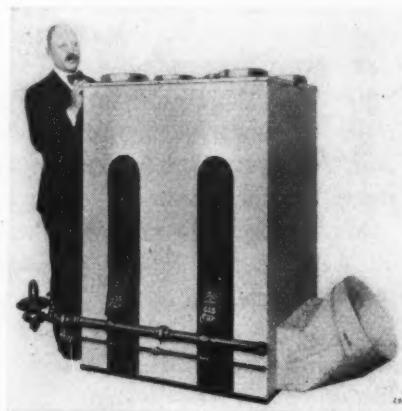
Lastly, the fire is up out of the ash pit, allowing it to remain cool and give the furnace the proper air circulation.

#### L. J. Mueller Furnace Co. Announces a New Pressed Steel Gas-Fired Furnace

One of the new developments in heating equipment is the new, pressed-steel gas-fired furnace announced by the L. J. Mueller Furnace company. The new furnace has been especially built in response to the great increase in the use of gas for heating, and the subsequent demand for a correctly designed, high grade furnace, built to modern standards of appearance, and available at a popular price.

The Mueller Gas-Era pressed-steel furnace, incorporates various

features which have become possible only due to the equipment available in the Mueller factory. Perhaps no other plant in the industry is as completely equipped with presses for sheet steel work, foundry facilities, and machinery for making casings and other equipment for furnaces. In addition to a complete line of both coal and gas-fired furnaces, boilers and cabinet heaters, the company also produces cast and stamped grilles and



registers and furnace fittings in the same plant, requiring all types of machines necessary for any kind of metal work.

Gas-Era pressed-steel furnaces embody the basic principles of the Gas-Era cast iron furnaces which have been widely known and sold. Each heating unit or "section" consists of two half sections welded together in a manner to form a most effective gas combustion chamber which graduates into a baffled, serpentine heat travel provided with ample corrugations to secure a maximum of prime heating surface. Heavy gauge, copper bearing sheets are used. This furnace is approved in all sizes by the American Gas Association, for an input rating of 45,000 B.t.u. per section. A straight-side casing with flat top, permitting the taking off of all warm air risers vertically contributes to a neat, compact and convenient assembly and is practical due to an overall height of only 53 inches.

An exclusive feature of this furnace, say the manufacturers, is the entirely sectional construction,

which constitutes a number of distinct advantages. The furnace is shipped as a package unit, in fibre cartons, and a proper size assembly for any job is readily handled by one man. Once the number of units or sections for a given job have been determined, it is only necessary to send from open stock the proper number of packages.

The accompanying illustrations show two of the interesting processes involved in manufacturing this product, and a complete two section furnace assembly. The huge 500 ton press turns out half sections of the heating units in one operation. The second machine shown is the seam welder on which the half sections of the heating units are welded together. The comparative over-all height of the flat topped casing is brought out by the figure of a man of average height, in the third illustration.

Further information and prices may be secured by writing to the manufacturers either at Milwaukee or at any of their branch offices.

#### COST ACCOUNTING

(Continued from page 23)

stand. We know that your better success lies through better book-keeping. We have about covered the field and now want to hear from you on questions which are not clear.

#### DOMESTIC STOKERS

(Continued from page 27)

the stoker keeps the temperature up until closing time and opens up early in the morning.

Owners of warm air heating plants have found that the stoker keeps the furnace uniformly hot and has no noise or trouble. As the Braden Manufacturing Company is directly connected with the warm air heating and sheet metal industries they have been particularly interested in using stokers with furnaces. They have found this method of automatic heating highly satisfactory to the home owners.

# ARMCO INGOT IRON

tested by time  
and exacting contractors

FOR more than twenty years sheet metal contractors everywhere have found Armco INGOT IRON a durable, easy-working metal. Wherever they used it, however they formed it, this uniform pure iron met every test.

Another advantage lies in the fact that Armco INGOT IRON is so well known. Sixteen years of continuous national advertising in such popular magazines as The Saturday Evening Post and Collier's, and radio broadcasting, has won for it widespread recognition as a low-cost, rust-resisting metal.

There is an Armco Distributor near you who will be glad to promptly serve your needs for Armco INGOT IRON. He carries a complete stock of galvanized, blue annealed, and black sheets, as well as formed products. If you can't locate him, write the nearest office below.

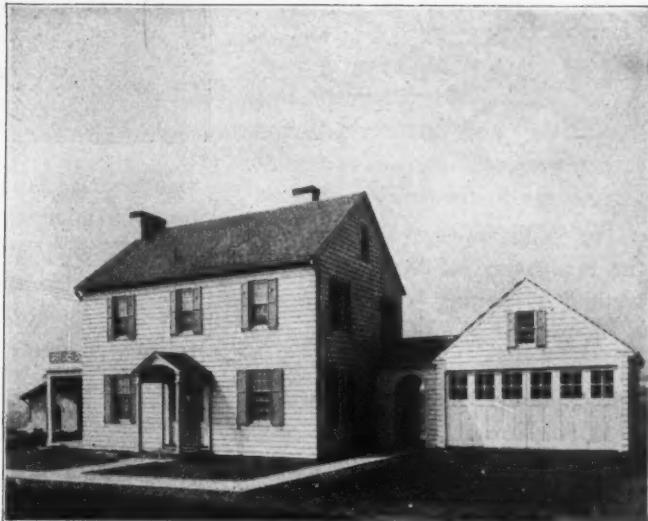
#### The AMERICAN ROLLING MILL COMPANY

Executive Offices, Middletown, Ohio

Export: The ARMCO International Corporation

DISTRICT OFFICES: Chicago Detroit Pittsburgh  
Cincinnati New York St. Louis  
Cleveland Philadelphia San Francisco

*This is the familiar symbol that identifies Armco INGOT IRON sheets and formed products. It stands for the skill and experience of Armco—a company that has pioneered and specialized in the manufacture of high-grade special analysis iron and steel sheets for nearly thirty years. Always point out this triangle to your customers, so that they may know they are getting long-lasting, low-cost sheet metal.*



This trim little house in McKeesport, Pennsylvania, is another "Model Home" in which rust-resisting Armco INGOT IRON was used for gutters and downspouts. Sheet Metal Contractor: John H. Bestwick & Son, McKeesport.



**"BE SURE IT'S MADE OF ARMCO INGOT IRON"**

*Mention AMERICAN ARTISAN in your reply—Thank you!*

## Williams Oil-O-Matic Preparing for Biggest Convention Yet Held

August 18th and 19th will witness the event of Williams Sixth International Convention in Bloomington, Ill., and already preparations are being made for an unusually large increase in attendance.

In 1925 nearly 1,000 people attended the first convention—each year the crowd has increased materially until last year's attendance totaled nearly 3,600.

This year the entire Warm Air Heating Industry is being invited to attend the convention. Dealers—salesmen—furnace manufacturers—register and fittings makers are all being urged to come and spend two interesting days.

The Williams story is one of the most romantic in the history of heating. A story of father and son. A son with the mechanical ability to create and master-salesman—father who sold and is selling the son's ideas to the world.

The Williams organization realize the importance of Warm Air as a method of heating—and the crying need for these same heating systems to be made automatic with oil heat. They realize the importance of having a warm air furnace properly planned and installed.

During the rapid growth of the oil burner the idea has sprung up from nowhere in particular that oil heating functions best in radiator heated homes. The thought is erroneous and preposterous and must be erased from the minds of dealers and the public in general.

More than ever before this company is squarely behind the Standard Code and better furnace installations. They are going to invite every furnace manufacturer in the United States and Canada to come and bring their gang with them.

This convention should reach the 5,000 mark in attendance and go a long, long way in helping to sell better Warm Air Heating installations.

## Meyer Furnace Uses Moving Pictures as Special Summer Sales Help

Over three years ago the Meyer Furnace Company began employing one of the most powerful media of this age—motion pictures—as an aid to its dealers in selling to the consumer.

This method of selling furnaces was first introduced with the production of "HAPPINESS," a professional photoplay by C. L. Venard in 1927 since which thousands of prospects have been "exposed" to twenty minutes of human interest movies interspersed with selling talk that holds the undivided attention

ried by the salesman, or placed at the dealer's disposal (there are now 36 outfits in use) and the picture is shown right in the prospect's home.



Its novelty has been proven in numerous instances by request for a second or third showing.



of the entire family group in a way that is unequaled by any other method—and with attention and interest and the need already there for a new heating plant the rest (closing the sale) is comparatively easy.

Now based upon several years experience with this hitherto unknown sales medium, another photoplay has been produced which is even better than the first in that it stresses the all important factor of



good installation and therefore should appeal particularly to dealers; also it is designed especially for the purpose of selling heating in the summer-time.

A small portable projector is car-

## Armco Has New Book on Galvanized Sheets Ready for Distribution

The American Rolling Mill Company has ready for distribution a new booklet telling many interesting things about Armco iron. This small booklet is attractively gotten up and is sprinkled with illustrations showing the uses of galvanized iron on all kinds of structures.

The text gives some of the highlights of the history of iron sheets for building purposes and the connection the American Rolling Mill Company has had with the development of this widely used sheet.

Requests for the booklet will be filled from the offices of the company, Middletown, Ohio.

## OIL BURNER GROWTH

*(Continued from page 33)*

tively. Louisiana with its ready access to supplies of fuel oil has more burners than any other Southern state, with 3.37 per cent or approximately 18,000.

At present there is only one domestic oil burner in the United States to every 224 inhabitants. On the basis of the 1920 population census Illinois has one burner to every 49 persons, New York one to every 101 persons, Pennsylvania one to every 249, and Massachusetts one to every 112.

# "Inland Service saved us a week"

**I**NLAND men know the value of time . . . their customers' time most of all. The whole organization is pointed toward giving superior service . . . toward surpassing the customer's expectations. Usually these efforts are accepted silently as merely a matter of course when dealing with Inland. But occasionally a customer voices his appreciation as did this customer of long standing whose letter is reproduced here.

# INLAND STEEL COMPANY

# ABLE SERVANT OF THE CENTRAL WEST

38 SOUTH DEARBORN STREET, CHICAGO

## Sheets Bands Bars Structural Plates Rivets Track Accessories Rails Billets

*Say you saw it in AMERICAN ARTISAN—Thank you!*

# ~ MARKET QUOTATIONS ~

AMERICAN ARTISAN is the only publication quoting Prices on Metals, Sheet Metal Equipment and Supplies, Warm Air Heating Supplies and Accessories, corrected bi-weekly. These quotations are not guaranteed but are obtained from reliable sources and reflect nation-wide market conditions at the time of going to press.

NOTE—These prices are Chicago Warehouse Prices to which must be added territory differentials

## METALS

### PIG IRON

Chicago Fdy., No. 2	\$17.50 to \$18.00
Southern Fdy. No. 2	18.01
Lake Superior Charcoal	27.04
Malleable	17.50 to 18.00

### FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC 20x28 112 sheets	\$22.50
IX 20x28	25.50
IXX 20x28 56 sheets	14.50
IXXX 20x28	15.50
XXXX 20x28	17.00

### TERNE PLATES

Per Box	
IC 20x28, 40-lb, 112 sheets	\$24.00
IX 20x28, 40-lb, 112 sheets	26.50
IC 20x28, 25-lb, 112 sheets	20.50
IX 20x28, 25-lb, 112 sheets	23.50
IC 20x28, 20-lb, 112 sheets	19.00
IV 20x28, 20-lb, 112 sheets	22.00

### "ARMCO" INGOT IRON PLATES

No. 8 ga.—110 lbs.	\$4.15
3/16 in.—100 lbs.	4.05
1/4 in.—100 lbs.	3.85

### COKE PLATES

Cokes, 80 lbs., base, 20x28	\$12.00
Cokes, 90 lbs., base, 20x28	12.20
Cokes, 100 lbs., base, 20x28	13.75
Cokes, 107 lbs., base, IC, 20x28	12.75
Cokes, 135 lbs., base, IX, 20x28	14.75
Cokes, 155 lbs., base, 2X, 56 sheets	8.50
Cokes, 175 lbs., base, 3X, 56 sheets	9.35
Cokes, 195 lbs., base, 4X, 56 sheets	10.23

### BLUE ANNEALED SHEETS

Base 10 ga....per 100 lbs.	\$3.35
"Armco" 10 ga....per 100 lbs.	4.15

### ONE PASS COLD ROLLED BLACK

No. 18-20	per 100 lbs.	\$8.75
No. 22	per 100 lbs.	3.70
No. 24	per 100 lbs.	3.75
No. 26	per 100 lbs.	3.95
No. 27	per 100 lbs.	3.90
No. 28	per 100 lbs.	4.00

### GALVANIZED

No. 16	per 100 lbs.	\$3.85
No. 18	per 100 lbs.	3.95
No. 20	per 100 lbs.	4.15
No. 22	per 100 lbs.	4.20
(Standard differentials on extra to apply)		

No. 24	per 100 lbs.	\$4.35
No. 26	per 100 lbs.	4.60
No. 27	per 100 lbs.	4.70
No. 28	per 100 lbs.	4.85
"Armco" 24	per 100 lbs.	5.95

### BAR SOLDER

Warranted 50-50....per 100 lbs.	\$21.05
45-55....per 100 lbs.	19.75
48-52....per 100 lbs.	20.05
Plumbers'....per 100 lbs.	17.40

### ZINC

In Slabs	\$5.50
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### SHEET ZINC

Cask Lots (600 lbs.)	\$12.00
Sheet Lots (100 lbs.)	13.00

### BRASS

Sheets, Chicago base	17 1/4 c
Tubing, brazed, Chicago base	25 1/4 c
Tubing, seamless, Chicago base	22 1/4 c
Wire, Chicago base	18 1/4 c
Rods, Chicago base	16 1/4 c

## AMERICAN ARTISAN

### COPPER

Sheets, Chicago base	20 1/2 c
Tubing, seamless, Chicago base	23 c
Wire, plain rd., 8 B. & S. Ga. and heavier	13 1/2 c

### LEAD

American Pig	\$6.50
Bar	8.50

### TIN

Bar Tin	per 100 lbs. \$39.00
Pig Tin	per 100 lbs. 38.00

### SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

### ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	7 1/2 c per lb.
Mill board 3/32 to 1/4	7 1/2 c per lb.

Corrugated paper (250 sq. ft. per roll)	\$6.00 per roll
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### ASBESTOS SEGMENTS

8 in.	per 100 sets \$7.30
9 in.	per 100 sets 8.80
10 in.	per 100 sets 9.30
12 in.	per 100 sets 10.50

### CLIPS

Damper	No-Rivet Steel, with tall pieces, per gross
	Rivet Steel, with tall pieces, per gross
	Tall pieces, per gross

### COPPER FOOTING

Copper Footing	36%
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### CORNICE BRAKES

Chicago Steel Bending	Net
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### CUT-OFFS

Cal. plain, round or cor. rd.	30%
28 gauge	35%

### DAMPERS

Yankee Hot Air	\$1.60
7 inch, doz.	2.20
8 inch, doz.	2.60
9 inch, doz.	3.00
10 inch, doz.	3.80
12 inch, doz.	5.50
14 inch, doz.	5.00

### EAVES TROUGH

Galv. Crimpedge, crated	75-10%
Zinc, "Barnes"	60%

### ELBOWS

Conductor Pipe	Galv. plain or corrugated, round flat Crimp.
28 gauge	60%
26 gauge	45%
24 gauge	15%

Galv. Terne Steel	Plain Rd. and Rd. Corr.
28 gauge	60%
26 gauge	45%
24 gauge	15%

### Square Corrugated

24 gauge	50%
26 gauge	35%
Portico Elbows	
Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested	70 & 5%
Nested solid	70 & 5%

### PASTE

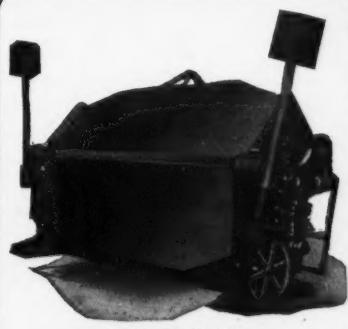
Asbestos Dry Paste	
200-lb. barrel	\$15.00
100-lb. barrel	7.75
50-lb. pall	4.50
25-lb. pall	2.50
10-lb. bag	1.20
5-lb. bag	0.60

### PIPE

Galvanized	
Crated and nested (all gauges)	73-74%
Crated and not nested (all gauges)	73-24%
Furnace Pipe	
Double Wall Pipe and Fittings	60%
Single Wall Pipe, Round Galvanized Pipe	60%
Galvanized and Tin Fittings	60%
Lead	
per 100 lbs.	
Stove	

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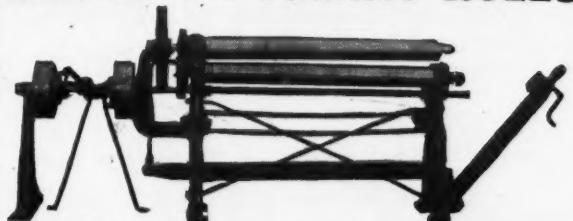
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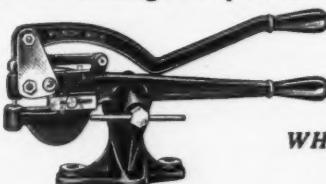
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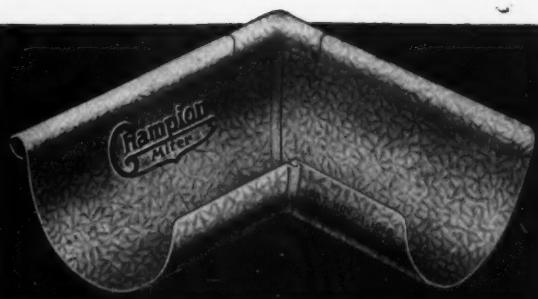
Punches  
and Tools

# BUYERS' DIRECTORY

<b>Air Cleaners</b> Meyer & Bro. Co., F., Peoria, Ill.	<b>Dampers—Quadrants—Accessories</b> Hart & Cooley Co., Holland, Mich. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Parker-Kalon Corp., New York, N. Y.	<b>Furnace Pokers</b> Fanner Mfg. Co., Cleveland, Ohio	<b>Handles—Soldering Iron</b> Hyro Mfg. Co., New York, N. Y. Handles—Furnace Door Fanner Mfg. Co., Cleveland, Ohio
<b>Air Washers</b> A. Gehri & Co., Tacoma, Wash.		<b>Furnace Pulleys</b> Hart & Cooley Co., Holland, Mich.	
<b>Aluminum Sheets</b> J. M. & L. A. Osborn Co., Cleveland, Ohio	<b>Dampproofings</b> Lastik Products Corp., Pittsburgh, Pa.	<b>Furnace Regulators</b> Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Sheer Co., H. M., Quincy, Ill. White Mfg. Co., Minneapolis, Minn.	<b>Hangers—Eaves Trough</b> Apex Gutter Hanger Corp., New York, N. Y. Berger Bros. Co., Philadelphia, Pa. Chase Brass & Copper Co., Waterbury, Conn. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.
<b>Bearings</b> Fafnir Bearing Co., New Britain, Conn.	<b>Damper Regulators</b> Sheer Co., H. M., Quincy, Ill. Diffuser—Air Duct Aeolus-Dickinson Co., Chicago, Ill.	<b>Furnace Rings</b> Forest City-Walworth Run Foundries Co., Cleveland, Ohio Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	<b>Heat Regulation Systems</b> Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Sheer Co., H. M., Quincy, Ill. White Mfg. Co., Minneapolis, Minn.
<b>Blast Gates</b> Berger Bros. Co., Philadelphia, Pa.	<b>Drills—Electric</b> Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve. J. M. & L. A. Osborn Co., Cleveland, Ohio The Stanley Electric Tool Co., New Britain, Conn.	<b>Furnace Switch—Automatic</b> Payne Furnace & Supply Co., Beverly Hills, Cal. Robinson Co., A. H., Massillon, Ohio	<b>Heaters—Cabinet</b> Fox Furnace Co., Elyria, Ohio Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. Payne Furnace & Supply Co., Beverly Hills, Cal. Waterman-Waterbury Co., Minneapolis, Minn.
<b>Blower Bearings</b> Fafnir Bearing Co., New Britain, Conn.		<b>Furnaces—Gas</b> Calkins & Pearce, Columbus, Ohio Mueller Furnace Co., L. J., Milwaukee, Wis. Payne Furnace & Supply Co., Beverly Hills, Cal. Robinson Co., A. H., Massillon, Ohio Rudy Furnace Co., Dowagiac, Mich. Wise Furnace Co., Akron, Ohio	
<b>Blowers—Furnace</b> American Machine Products Co., Marshalltown, Iowa A. Gehri & Co., Tacoma, Wash. Brundage Co., Kalamazoo, Mich. Lakeside Co., Hermansville, Mich.	<b>Drive Screws—Hardened Metallic</b> Parker-Kalon Corp., 190 Varick St., New York	<b>Furnaces—Oil Burning</b> Motor Wheel Corp., Heater Div., Lansing, Mich.	<b>Heaters—School Room</b> Meyer Furnace Co., The, Peoria, Ill. Western Steel Products Co., Duluth, Minn. Waterman-Waterbury Co., Minneapolis, Minn.
<b>Bolts—Stove</b> Lamson & Sessions Co., Cleveland, Ohio Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.	<b>Dust Eliminator</b> Dustless Ash Co., Muskegon, Mich.	<b>Furnaces—Warm Air</b> Agricola Furnace Co., Gadsden, Ala. American Furnace Co., St. Louis, Mo. The Beckwith Co., Dowagiac, Mich. Brillton Furnace Co., Brillion, Wis. Farris Furnace Co., Springfield, Ill. Forest City-Walworth Run Fdy., Cleveland, Ohio Fox Furnace Co., Elyria, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Heas Warming & Ventilating Co., Chicago, Ill. Langenberg Mfg. Co., St. Louis, Mo. London Furnace Co., London, Ohio Lennox Furnace Co., Marshalltown, Iowa May Fliebeger Furnace Co., Syracuse, N. Y. Meyer Furnace Co., Newark, Ohio Midland Furnace Co., Columbus, Ohio Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. Mueller Furnace Co., L. J., Milwaukee, Wis. Payne Furnace & Supply Co., Beverly Hills, Cal. Premier Warm Air Heater Co., Dowagiac, Mich. Peerless Foundry Co., Indianapolis, Ind. Robinson Co., A. H., Massillon, Ohio Rudy Furnace Co., Dowagiac, Mich. Success Heater Mfg. Co., Des Moines, Iowa Schwab & Sons Co., R. L., Milwaukee, Wis. Waterman-Waterbury Co., Minneapolis, Minn. Western Steel Products Co., Duluth, Minn. Wise Furnace Co., Akron, Ohio	<b>Humidifiers</b> Diener Mfg. Co., G. W., Chicago, Ill. Meyer & Bro. Co., F., Peoria, Ill. Sheer Co., H. M., Quincy, Ill.
<b>Brakes—Bending</b> Dreis & Krump Mfg. Co., Chicago, Ill. Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.			<b>Lath—Expanding Metal</b> Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.
<b>Brakes—Cornices</b> Dreis & Krump Mfg. Co., Chicago, Ill.			<b>Machines—Crimping</b> Bertsch & Co., Cambridge City, Ind.
<b>Brass and Copper</b> American Brass Co., Waterbury, Conn. Chase Brass & Copper Co., Waterbury, Conn. Copper & Brass Research Association, New York, N. Y. Revere Copper & Brass, Rome, N. Y.	<b>Elbows and Shoes—Conductor</b> Apex Gutter Hanger Corp., New York, N. Y. Barnes Metal Products Co., Chicago, Ill. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Rockford Sheet Steel Co., Rockford, Ill.		<b>Machinery—Culvert</b> Bertsch & Co., Cambridge City, Ind. Interstate Machinery Co., Chicago, Ill.
<b>Bronze</b> Revere Copper & Brass, Rome, N. Y.	<b>Fittings—Conductor</b> Barnes Metal Products Co., Chicago, Ill. Braden Mfg. Co., Terre Haute, Ind. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.		<b>Machines—Tinsmith's</b> Bertsch & Co., Cambridge City, Ind. Dreis & Krump Mfg. Co., Chicago, Ill. Hyro Mfg. Co., New York, N. Y. Interstate Machinery Co., Chicago, Ill. Marshalltown Mfg. Co., Marshalltown, Iowa Osborn Co., The J. M. & L. A., Cleveland, Ohio Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve. The Stanley Electric Tool Co., New Britain, Conn. Whitney Mfg. Co., W. A., Rockford, Ill.
<b>Cans—Garbage</b> Diener Mfg. Co., G. W., Chicago, Ill. Osborn Co., The J. M. & L. A., Cleveland, Ohio	<b>Fluxes—Soldering</b> Kester Soldering Co., Chicago, Ill.	<b>Gas Burning Attachments</b> Munkel-Rippel Heating Co., Columbus, Ohio	<b>Metals—Perforated</b> Harrington & King Perforating Co., Chicago, Ill.
<b>Castings—Malleable</b> Fanner Mfg. Co., Cleveland, Ohio			
<b>Ceilings—Metal</b> Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	<b>Furnace Cement</b> Connors Paint Mfg. Co., Wm., Troy, N. Y. Lastik Products Corp., Pittsburgh, Pa. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	<b>Grilles</b> Auer Register Co., Cleveland, Ohio Harrington & King Perforating Co., Chicago, Ill. Hart & Cooley Co., New Britain, Conn. Independent Register & Mfg. Co., Cleveland, Ohio Tuttle & Bailey Mfg. Co., Chicago, Ill.	<b>Miters—Eaves Trough</b> Barnes Metal Products Co., Chicago, Ill. Berger Bros. Co., Philadelphia, Pa. Braden Mfg. Co., Terre Haute, Ind. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.
<b>Chaplets</b> Fanner Mfg. Co., Cleveland, Ohio			
<b>Cleaners—Vacuum</b> Brillion Furnace Co., Brillion, Wis. National Super Service Co., Toledo, Ohio	<b>Furnace Chain</b> Hart & Cooley Co., Holland, Mich.		<b>Nails—Copper and Brass</b> Chase Brass & Copper Co., Waterbury, Conn. Revere Copper & Brass, Rome, N. Y.
<b>Copper</b> American Brass Co., Waterbury, Conn. Chase Brass & Copper Co., Waterbury, Conn. Revere Copper & Brass, Rome, N. Y. Rockford Sheet Steel Co., Rockford, Ill.	<b>Furnace Cleaners—Suction</b> Brillion Furnace Co., Brillion, Wis. National Super Service Co., Toledo, Ohio	<b>Guards—Machine and Belt</b> Harrington & King Perforating Co., Chicago, Ill.	
<b>Cornices</b> Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	<b>Furnace Fans</b> A-C Mfg. Co., Pontiac, Ill. Brundage Co., The, Kalamazoo, Mich. Lakeside Co., Hermansville, Mich. Robinson Co., A. H., Massillon, Ohio	<b>Handles—Boiler</b> Berger Bros. Co., Philadelphia, Pa.	
<b>Cut-offs—Rain Water</b> Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	<b>Furnace Paste</b> Western Mineral Products Co., Omaha, Neb.		

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(Continued on page 56)



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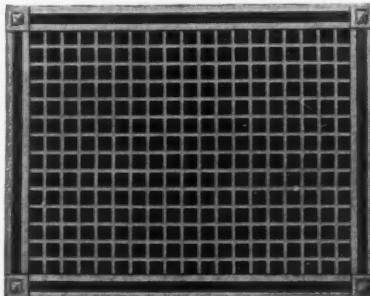
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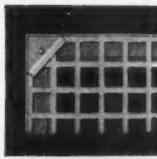
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# BUYERS' DIRECTORY

(Continued from page 54)

**Nails—Hardened Masonry**  
Parker-Kalon Corp., New York, N. Y.

**Oil Burners**  
Crystal Oil Burner Corp., New York, N. Y.  
McIlvaine Burner Corp., Evanston, Ill.  
Silent Automatic Corp., Detroit, Mich.

**Paint**  
Connors Paint Mfg. Co., Wm., Troy, N. Y.

**Perforated Metals**  
Harrington & King Perforating Co., Chicago, Ill.

**Pipe and Fittings—Furnace**  
Henry Furnace & Fdy. Co., Cleveland, Ohio  
Lamneck & Co., W. E., Columbus, Ohio  
Meyer & Bro. Co., F., Peoria, Ill.  
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.  
Mueller Furnace Co., Milwaukee, Wis.  
Osborn Co., The J. M. & L. A., Cleveland, Ohio  
Peerless Foundry Co., Indianapolis, Ind.

**Pipe and Fittings—Stove**  
Meyer & Bro. Co., F., Peoria, Ill.  
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

**Pipe—Conductor**  
Barnes Metal Products Co., Chicago, Ill.  
Berger Bros. Co., Philadelphia, Pa.  
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

**Punches**  
Bertsch & Co., Cambridge City, Ind.  
Hyro Mfg. Co., New York  
Interstate Machinery Co., Chicago, Ill.  
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.  
W. A. Whitney Mfg. Co., Rockford, Ill.

**Punches—Combination Bench and Hand**  
Hyro Mfg. Co., New York, N. Y.

**Punches—Hand**  
Hyro Mfg. Co., New York, N. Y.  
W. A. Whitney Mfg. Co., Rockford, Ill.

**Putty—Stove**  
Connors Paint Mfg. Co., Wm., Troy, N. Y.

**Radiator Cabinets**  
Hart & Cooley Co., Holland, Mich.

**Ranges—Gas**  
The Beckwith Co., Dowagiac, Mich.  
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.  
Richardson & Boynton Co., New York, N. Y.

**Registers—Warm Air**

Auer Register Co., Cleveland, Ohio  
Forest City-Walworth Run Foundries Co., Cleveland, Ohio  
Hart & Cooley Co., Holland, Mich.  
Henry Furnace & Fdy. Co., Cleveland, Ohio  
Independent Register & Mfg. Co., Cleveland, Ohio  
Ku-No Register Mfg. Co., St. Louis, Mo.  
Lamneck & Co., W. E., Columbus, Ohio  
Meyer & Bro. Co., F., Peoria, Ill.  
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.  
Mueller Furnace Co., L. J., Milwaukee, Wis.

Rock Island Register Co., Rock Island, Ill.

Symonds Register Co., St. Louis, Mo.

Tuttle & Bailey Mfg. Co., Chicago, Ill.

### Registers—Wood

American Wood Register Co., Plymouth, Ind.  
Auer Register Co., Cleveland, Ohio  
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

### Regulators—Heat

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
H. M. Sheer Co., Chicago, Ill.  
White Mfg. Co., Minneapolis, Minn.

### Ridging

American Rolling Mill Co., Middletown, Ohio  
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

### Rivets—Stove

Lamson & Sessions Co., Cleveland, Ohio  
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

### Rods—Stove

Lamson & Sessions Co., Cleveland, Ohio

### Rolls—Forming

Bertsch & Co., Cambridge City, Ind.  
Interstate Machinery Co., Chicago, Ill.

### Roofing Cement

Connors Paint Mfg. Co., Wm., Troy, N. Y.  
Lastik Products Corp., Pittsburgh, Pa.

### Roof—Flashing

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

### Roofing—Iron and Steel

American Rolling Mill Co., Middletown, Ohio  
Central Alloy Division, Republic Steel Corp., Youngstown, Ohio  
Inland Steel Co., Chicago, Ill.  
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.  
Osborn Co., The J. M. & L. A., Cleveland, Ohio  
Ryerson & Sons, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

### Roofing—Tin

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.  
Taylor Co., N. & G., Philadelphia, Pa.

### Rubbish Burners

Hart & Cooley Co., New Britain, Conn.

### Schools—Sheet Metal Pattern Drafting

St. Louis Technical Institute, St. Louis, Mo.

### Schools—Warm Air Heating

St. Louis Technical Institute, St. Louis, Mo.

### Screws—Hardened Metallic Drive

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.  
Parker-Kalon Corp., 200 Varick St., New York

### Screws—Hardened Self-Tapping, Sheet Metal

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.  
Parker-Kalon Corp., 200 Varick St., New York

### Screws—Hardened Self-Tapping, Sheet Metal

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.  
Parker-Kalon Corp., 200 Varick St., New York

### Soldering Coppers

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.  
Revere Copper & Brass, Rome, N. Y.

### Screens—Perforated Metal

Harrington & King Perforating Co., Chicago, Ill.

### Shears—Hand and Power

Interstate Machinery Co., Chicago, Ill.  
Marshalltown Mfg. Co., Marshalltown, Ia.

Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.  
The Stanley Electric Tool Co., New Britain, Conn.

Viking Shear Co., Erie, Pa.

### Sheet Metal Screws—Hardened, Self-Tapping

Parker-Kalon Corp., 200 Varick St., New York

### Sheets—Alloy

Central Alloy Division, Republic Steel Corp., Youngstown, Ohio  
International Nickel Co., New York, N. Y.

### Sheets—Black and Galvanized

American Rolling Mill Co., Middletown, Ohio

Central Alloy Division, Republic Steel Corp., Youngstown, Ohio  
Inland Steel Co., Chicago, Ill.

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.  
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Rockford Sheet Steel Co., Rockford, Ill.

Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.  
Taylor Co., N. & G., Philadelphia, Pa.

### Sheets—Iron

American Rolling Mill Co., Middletown, Ohio

Central Alloy Division, Republic Steel Corp., Youngstown, Ohio  
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

### Sheets—Tin

Taylor Co., N. & G., Philadelphia, Pa.

### Shingles and Tiles—Metal

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

### Sifters—Ash

Diener Mfg. Co., G. W., Chicago, Ill.

### Sign Equipment—Electric

Metal Products Co., Milwaukee, Wis.

### Sky Lights

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

### Snips

Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

### Solder—Acid Core

Kester Solder Co., Chicago, Ill.

### Solder—Self-Fluxing

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### Solder

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### Specialties—Hardware

Diener Mfg. Co., G. W., Chicago, Ill.

### Stars—Hard Iron Cleaning

Fanner Mfg. Co., Cleveland, Ohio

### Tinplate

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Osborn Co., The J. M. & L. A., Cleveland, Ohio  
Taylor Co., N. & G., Philadelphia, Pa.

### Tools—Tinsmith's

Bertsch & Co., Cambridge City, Ind.  
Dries & Krump Mfg. Co., Chicago, Ill.

Hyr. Mfg. Co., New York, N. Y.  
Interstate Machinery Co., Chicago, Ill.

Osborn Co., The J. M. & L. A., Cleveland, Ohio

Rockford Sheet Steel Co., Rockford, Ill.

Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

The Stanley Electric Tool Co., New Britain, Conn.

Viking Shear Co., Erie, Pa.  
Whitney Mfg. Co., W. A., Rockford, Ill.

### Torches

Diener Mfg. Co., G. W., Chicago, Ill.  
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

### Trade Extension

Copper & Brass Research Association  
National Association of Flat Rolled Steel Manufacturers, Cleveland, Ohio

### Trimmings—Stove and Furnace

Fanner Mfg. Co., Cleveland, Ohio

### Vacuum Cleaner—Furnace

Brillion Furnace Co., Brillion, Wis.  
National Super Service Co., Toledo, Ohio

### Ventilators

Aeolus Dickinson Co., Chicago, Ill.  
Berger Bros. Co., Philadelphia, Pa.

Paul R. Jordan & Co., Indianapolis, Ind.

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

### Ventilators—Ceiling

Hart & Cooley Co., New Britain, Conn.  
Henry Furnace & Fdy. Co., Cleveland, Ohio

### Wood Faces—Warm Air

Auer Register Co., Cleveland, Ohio

American Wood Register Co., Plymouth, Ind.

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

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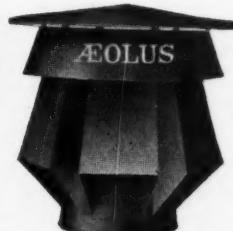


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## WANTS AND SALES

Yearly subscribers to the AMERICAN ARTISAN may insert advertisements of not more than fifty words in our Want and Sales Columns WITHOUT CHARGE for three insertions.

Such advertisements, however, must be limited to help or situation wanted, tools or equipment for sale, to exchange or to buy, business for sale or location desired, and must reach our office ten days prior to date of publication. This privilege is not extended to manufacturers or jobbers—or those making a business of buying and selling used machines—employment agencies and brokers.

When sending advertisement state whether your name or blind number is to be used.

## BUSINESS CHANCES

For Sale—One-third interest in plumbing, heating and sheet metal and hardware business. One of the best equipped and most reliable establishments of its kind in Northwest Iowa. Steadily growing increase in business. Well known over a large territory with a wide range of customers. Excellent opportunity for interested party. Address Y-524, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

For Sale—My established tin and plumbing shop. This is in the best town between Mankato and Minneapolis. A big territory to draw from. Reason for selling, ill health and old age. Has been running the past 40 years. Good tools, 8 ft. brake and all that is necessary to make it a good shop. Address F-524, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

For Sale—Sheet metal and furnace business near Los Angeles, Calif. All new equipment. Physical ailment forcing me out. A real opportunity for an energetic man or partnership to buy right. \$2,000.00 can handle this now. Investigate today. Address R-524, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

For Sale—Good established Tin Shop, Roofing and Furnace Business. Best location in Ohio town of 50,000. Will sell very reasonably for cash. Good opportunity for a hustler. Selling on account of ill health. Address S-524, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Inventor has invented and U. S. Pat. applied for a steel furnace with a heating and frigid forced air combination. Desires connection with reliable mfg. concern. Address M. Braunstein, 706 West 120th Street, Chicago, Illinois. M-525

## SITUATION WANTED

Position Wanted—By sheet metal worker and warm air heating man. Would like to connect with hardware firm having sheet metal shop. Have no objection to working in store slack time or making myself useful in any capacity. 33 years of age, 14 years at the trade; want steady position and will go anywhere. Address E-525, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Executive and Heating Engineer—35 years old, 15 years' experience in the manufacture, installation and sales of stoves and furnaces. Has had charge of production, credit, accounting and sales departments. Compensation proposition is important but first consideration is permanent position with possibilities. For further details, address A-525, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation wanted by an all around tinner and furnace man, furnace heating a specialty. Can also do plumbing and assist in hardware store. Steady and reliable, no floater. Permanent position wanted in small town or city in Central Western States. Address J-525, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Good all around tinner and furnace and gutter work. Can handle all small town shop work. Steady, reliable and sober. 8 years in last town. Can go at once to any small town or city in Illinois. Will work for nominal wages. Phone (Chicago) Mansfield 9132 or address F-525, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By a first class sheet metal mechanic with 20 years' experience—12 years as working foreman. Can handle any kind of sheet metal contract, large or small. Would like to hear from some really alive shop—South preferred. Please state salary paid for permanent situation. Address P. O. Box 206, Andover, New York. X-523

Situation Wanted—By a combination man—plumbing, sheet metal and furnace. Twenty years at the trades. Forty years old, married, steady, sober; good on warm air heating, gas furnaces and lead work. Five years foreman. Can take charge and can leave at once. Address Y-523, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Some sheet metal jobber or furnace manufacturer is looking for a man for a road position that has had 28 years' experience in the sheet metal business. 45 years old, married, and can give references from most any section of the country. Address Z-523, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Position Wanted—By experienced sheet metal worker. Experienced in all branches of the trade, on inside or outside work, gutters, furnaces, ventilation, and general work of any kind. Can run a shop, lay out and estimate. Middle aged, sober, and good mechanic. Prefer steady job. Address A-524, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By a first class tinner and sheet metal mechanic in all branches of the trade, heating and ventilating, furnace work, hotel and kitchen equipment, dairy equipment and general sheet metal work of any kind. Address Z-524, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—In small town with concern in need of a good all around sheet metal worker and furnace man. Capable of taking full charge of shop and can furnish best of references. Address Bert Hawkins, 314 N. Howell, Owosso, Mich. W-523

## SITUATION WANTED

Situation wanted by sheet metal worker. Older man who can work from blue prints, lay out, cut patterns and handle anything in the building line. Address K-525, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By sheet metal worker experienced on ventilation work, blow-piping, boiler breechings and heavy gauge work from blue prints. Address P. O. Box 1385, Hammond, Ind. B-525

Position Wanted—Some slate manufacturer or slate jobber of prominence is looking for a man who can sell slate. For further details address T-524, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Position Wanted—Engineer, furnace salesman extraordinaire open for immediate connection. Address W-524, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

## HELP WANTED

Wanted—A live wire combination plumber and tinner to act as assistant manager; must be reliable, a business getter and know the trade. An opportunity for a good man. Two experienced helpers also needed. Address Independent Supply Co., Inc., West Frankfort, Ill. B-524

Wanted—Sheet metal worker and furnace man. One steady and reliable who understands heating and ventilating and can work from blue prints and understands how to read blue prints. This is a good steady job for the right man. Address Barnett's Sheet Metal Works, Dodge City, Kan. L-524

Salesman Wanted—Some knowledge of heating to sell McIlvaine Oil Burners. Good field to work in. You must act quick as season is well under way. Address H. R. Wolfe Sheet Metal Works, 301 East Broadway, Waukesha, Wis. K-524

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Wanted at Once—First class radiator man. Steady work year around. Must be able to handle any kind of radiator and do repair work. Address J. H. Barnett, 312 W. Front St., Dodge City, Kan. H-524

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For Sale—1—20" bar folder, \$15.00. 1—20" grooving machine, \$7.00. 1—Large burring machine, \$8.00. 1—Setting down machine, \$5.00. All are Pexto incased machines in good order. Also have some hand tools cheap. Address Geo. Shoop, Conneaut, Ohio.

O-525

For Sale—Tinners' Machines, square shears, rolls, folders, etc., also large pipe dies, cutters and wrenches—safe, typewriter, etc. Ask for price and description of what you can use. Address City Tin Shop, Harbor Beach, Mich. D-524

## TOOLS AND MACHINES

Wanted—Five or six foot power brake, half inch capacity; five or six foot bending rolls, one-quarter inch capacity; power rotary shear, quarter inch capacity. Address G-525, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Wanted—One second hand  $3\frac{1}{2}$ " x 37" or 48" forming roll. Must be in good condition. State lowest cash price for same. Address C-525, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

For Sale—All steel box and pan brake, length 72", weighs about 2000 pounds. This pan used about 10 days. Priced to sell. Address Barnum Supply House, Mankato, Minn. D-525

Wanted—One second hand Brillion Vacuum Cleaner complete. Must be reasonable and in good condition. Address O-524, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Wanted—Used 8 or 10 ft. brake to bend  $\frac{3}{4}$ " plate, hand or power driven. Mail description and price to Jacob Brenner, Fond du Lac, Wis. L-525

## MISCELLANEOUS

For Sale—Slightly used Utica Smokeless Cast Sectional Steam Boiler, 3000 feet of radiation. Address E. A. Knabe, Rock Falls, Illinois.

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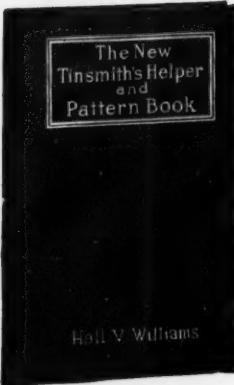
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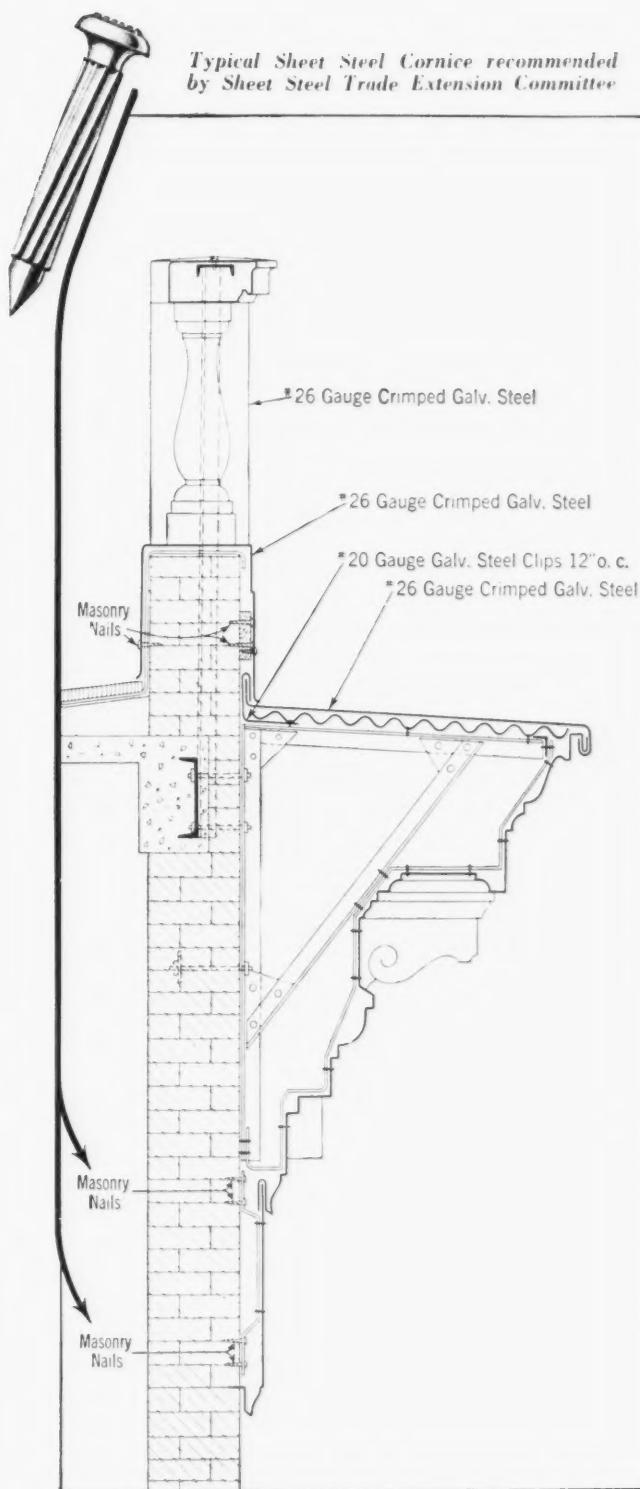
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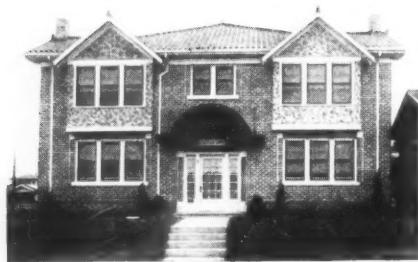
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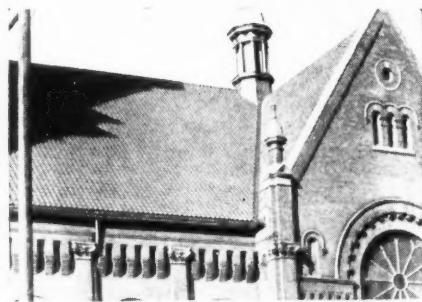
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